

# SCIENCE

VOL. 103

Friday, March 1, 1946

NO. 2670

## *Special Program Issue*

The National Science Foundation: S. 1850, Final Senate Bill

Howard A. Meyerhoff

Revision of the Association's Constitution

Otis W. Caldwell

Burton E. Livingston

F. R. Moulton

Program for St. Louis Meetings

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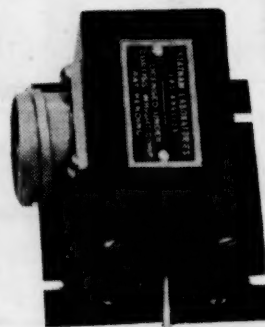
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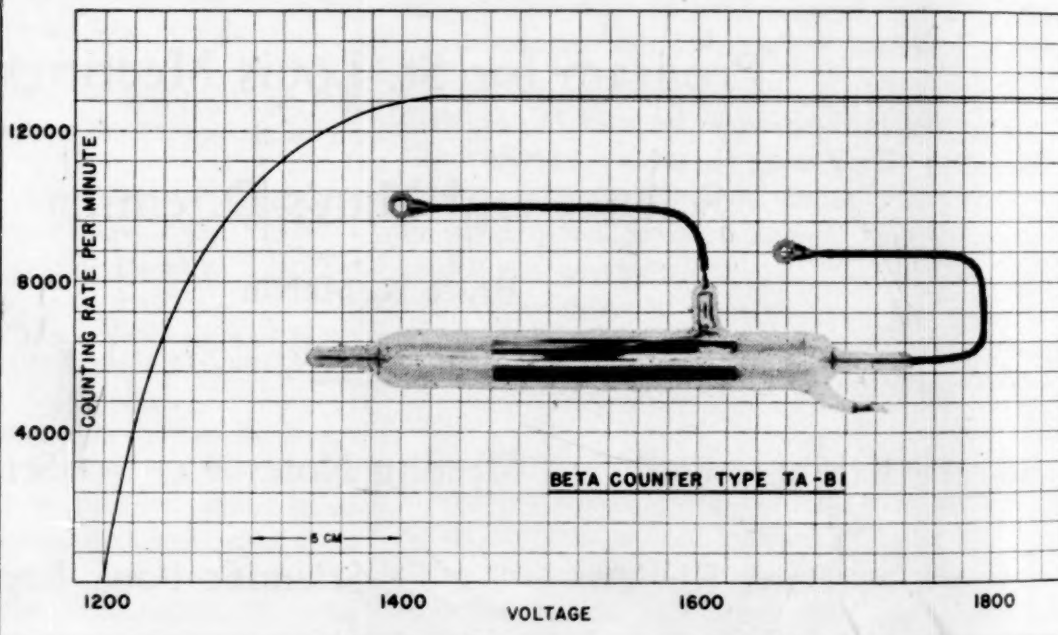
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# SCIENCE

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Friday, March 1, 1946

## Science and Man's Dilemma

Bruce L. Melvin

Secretary, Section K, AAAS

THE PHYSICAL LAWS used in the production of the atomic bomb were not new to the physicists; but it took the destruction of two Japanese cities to reveal to the mass of humanity the fact that man today, as never before, has the power to destroy himself completely. Humanity is now haunted by an uneasy fear that an unconquerable monster has been released. But uneasiness and alarm possessed the student of human welfare before Hiroshima was destroyed. Lewis Mumford, months prior to that date wrote:

Modern man is the victim of the very instruments he values most. Every gain in power, every mastery of the natural forces, every scientific addition to knowledge, has proved potentially dangerous because it has not been accompanied by equal gains in self-understanding and self-discipline. We have sought to attain perfection by eliminating this human element. The disproportionate development of the sciences themselves only hasten the benign end (*The condition of man*, p. 393).

This quotation crystallizes two most disturbing questions: Does humanity know how to live with the physical power it possesses? Can science, or can man by using scientific methods, control his own destiny?

Preponderating evidence forces negative answers to both these questions. World War II, with its wholesale destruction, is followed by starvation, cold, and disease. The United States failed to solve its human problems of poverty and unemployment that broke the spirit and injured the health of millions during the 1930's. It took the global cataclysm to provide jobs for the mass of our working population: unemployment was conquered by forces of destruction rather than by constructive effort.

America and American scientists now hold a unique position of power on the one hand and a national and a global responsibility on the other. Spengler observed prevalent characteristics of the German society, and upon his observations forecast the doom of the West. Concentration camps and scientifically designed murders attest the ability he possessed to perceive trends. A dominant fear on the part of the

student of cultures now is that German depravity was only a forerunner of a general depravity towards which all Western civilization is descending. To examine this possibility and to help define more succinctly the dilemma facing science a few facts respecting trends in pre-Hitler Germany and present-day America are first given, followed by a few suggestions as to what scientists may do.

### PRE-HITLER GERMANY

The pertinent fact about Germany, for the scientist, is that Germany was a world leader in science before World War I and between the two wars. Unhappily, the years between 1933 and 1939 saw the scientists of that country make a retreat from the free spirit of scientific discovery and become not free men but Nazi tools. Some of the great scientists fled, but the majority—as did the German Universities—became only putty in the hands of a state morality that used scientific methods to perpetrate legalized crimes and inflate the egos of the perpetrators. The philosopher of degradation, Spengler, some years before Hitler, did not see science as a tool in the service of man, but saw in it an instrument for the attainment of the supremacy of a few over many, as the rule of the technics, and as a means of routinizing and devaluating the individual. Though he marshaled his facts from the entire panorama of history, he could not have ventured on such a thesis had he not felt the chilly winds of Germany's mechanized objective life on the one hand and her subjective fear, frustration, and insecurity on the other. It was from a people, part of whom were highly trained in scientific methods but who had lost hope of securing jobs or making their adjustment into society, that Hitler built his regimented machine. The Germans, trained and untrained, who had suffered from insecurity and frustration were willing to fall into the goose step when ordered, to accept supinely a suggestion to persecute the Jews, or to desist from any act, regardless of how strongly it might be morally impelled, if it was "verboten."

Out of race prejudice Hitler erected race hatred and race slaughter; from personal despair, frustration, and social disorganization he built individual pride and his "new" social order. By accusations, persecutions, haranguings, marching, singing, Hitler brought unity out of disunity, fanaticism out of despair, transferred feeling of guilt and failure from the Germans to others, and set his nation on the high road of its own destruction. All this after a distinguished record of accomplishments in science! Pertinent to this fact Lewis Mumford asks:

Had not Germany long led the world in philosophy, in music, in scholarship, in the sciences? So convinced, indeed, was a large part of mankind of the soundness of this civilization that it refused to heed the malignity of the Fascists' inventions or the hideous results that flowed from them (*The condition of man*, p. 369).

Then there was the wild inflation and the economic depression in which security was taken from millions overnight. Germany could not withstand the impact of poverty and widespread unemployment. Hitler gave work. Indeed, it may be observed that a spearhead—if not *the* spearhead of the early Nazi movement—were some 50,000 technically trained college men who could not find a niche in Germany's economic organization.

#### SYMPTOMS IN AMERICAN LIFE

It would be foolhardy to assert that America will immediately go the way of Germany, but some of the same symptomatic trends of destruction once prevalent in Germany may be observed in America. An eminent economist, some three years ago when under fire by a Congressional Committee for what the Congressmen thought he believed, said to the author: "In 1933 I told my German friends in Berlin what was coming. They would not believe me. Now I fear for the United States." A second widely known American scholar, who lived for three years with a Nazi husband in Germany during Hitler's ascendancy, recently remarked: "I see so many signs in America, like those so prevalent during those years, that I shudder for the future." Neither of these is an alarmist; both are highly trained social scientists.

One of the most vicious of these signs is race prejudice, which has raised its ugly head out of many psychoeconomic quagmires since Pearl Harbor to strike violently against the American-born Japanese, the Negroes, and the Jews. This green-headed hatred, if limited evidence can be trusted, appeared more and more frequently and in widely scattered places as America approached victory. Within a few months preceding VE-Day there were 16 shooting incidents in California directed at the Japanese-Americans,

Mrs. Agnes Meyer, in the *Washington Post*, 4 May 1945, wrote: "In California Americans of Japanese extraction are being terrorized with shootings and dynamite bombs, yet the terrorists are exonerated by juries on the statement of their council, 'This is white man's country.' Prejudice, fear and greed prevent the local authorities from protecting the homes of our fighting men whose parents were Japanese. Moreover, the Supreme Court approved 'our worst war-time mistakes,' the removal of the Japanese from the West Coast, which, according to Eugene V. Rostow (*Harper's Magazine*, September 1945), 'was an injustice in no way required or justified by the war.'

Other types of race hatred have sprung up like weeds in a fertile field. Anti-Jewish antagonism appears to have been systematically organized in New England. In some cities hatred has been intensified against the Jews and, in other places, against the Catholics. Not all who know the situation are opposed to it. Racial hatreds and accompanying violence stem from definite psychological characteristics of individuals and economic and sociological traits of the society. Hatreds accompanied by jealousy, a feeling of insecurity, frustration, disappointment with life goals, the desire for dominance, and a paucity of individual and social guidance of ideals are among the maladies of man's spirit. These are the subjective traits of the inner man that parallel social disorganization. America was badly disorganized during the 1930's but did not know it. The failure then to meet the human problems of inadequate food and protection of health was a national scandal later revealed by the Selective Service examinations. Of 10,000,000 men examined by local draft boards between 7 December 1941 and 31 December 1943, 3,600,000, or over one-third, were physically unfit. Before Pearl Harbor, when the physical standards were at their highest level, 52.6 per cent of all men examined were rejected. Those who studied the problems of the growing numbers of unemployed and maladjusted youth during the 1930's were in no way surprised that the report on the "Physical examinations of Selective Service registrants during the war-time" read: "... while the standards maintained by the military forces have been admittedly high, the prevalence of disqualifying defects has become a matter of national concern, not only from the viewpoint of the armed forces, but from the standpoint of national health as well."

Other prewar characteristics reveal the amnesia in our social body. The marked phenomena of the 1920's were the dominance of gangsterism, lawlessness and a mad race for gain by chance and speculation, and the heavy migration from country to city. When the United States floundered in the whirlpool of depression, all ameliorative measures were con-



... machine-gunned by intrenched interests and well-intentioned guardians of the status quo. Our moral flabbiness was most blatantly revealed in our refusal to raise a finger against international aggression, first in Asia and then in Europe. We turned against the gangsters when their depredations became so widespread that no citizen was safe; we rose against the international gangsters after we were attacked.

Then there is another possibility: the United States may follow a course of inflation and complete disorganization. If the United States again goes on a wild spree of buying, selling, and speculation, it is to be expected that we shall plunge into another depression in which all the above-mentioned trends which lead to an authoritarian society will rush forth like a desert brook—having only trickles in the dry season but a dangerous, devastating flood when the rain comes. The symptoms of complete social and economic disorganization are with us. Strikes, picket lines, tear gas, refusal to compromise—all are marks of growing factionalism, distrust, fear. These maladies cannot be put down by the physical inventions, but they may be cured by the scientific method.

#### SCIENCE AND THE FUTURE

What happens in America will go far in determining the destiny of the world. Moreover, if we cannot solve our own problems, how can we give adequate aid to those baffling situations that belong to world affairs? There are two courses to follow: to accept the destruction of man as inevitable, or to take hold of national and world problems involving the biological and psychological man, and economic, political, and social relations in both national and international realms.

The implications of the foregoing discussion, when coupled with man's new-found atomic power, are ominous; they forecast the inevitable rapid destruction of man, the first of these alternatives. This is in accordance with conclusions held by some scientists. For example, Dr. Gerrit S. Miller, Jr., writing in *Science*, when the man on the street had not dreamed of the atomic bomb (*Science*, 1941, 94, 163-164), said:

... in his mental constitution man unites the dominating type of social behavior that is common to most anthropoid primates ... with such a unique genius for "implementing" it as to make a totally new phenomenon in animal evolution. This combination may well prove to be, in the end, as racially lethal as the huge size and great bodily specialization of titanotheres, proboscideans and dinosaurs appear to have been in the past.

That type of social behavior is *domination* or, as the psychologists may call it, the desire to dominate.

War, the desire for huge fortunes, the urge to surpass others (all basic in our economic, political, and social systems) are expressions of this primate characteristic, if the present writer understands the quotation correctly. Science has now put into the hands of the highest form of primate the power of his own destruction.

But what has science to offer man by which he can save himself? What can science offer the American politician as well as the American citizen that it did not give to the Germans? The first contribution it can make is the basic philosophy that has made science possible, namely, the openminded search for truth. Respecting racial hatreds, the anthropologists have amply shown that there are no basic differences among races. Therefore, scientists of all types have the responsibility of helping to put that fact into practice in our society.

If this is to be done, it requires man, the primate, to conquer his own innate characteristic, which is the urge for domination. It is in this respect that "modern man is obsolete, a self-made anachronism becoming more incongruous by the minute. He has exalted change in everything but himself. He has leaped centuries ahead in inventing a new world to live in but he knows little or nothing about his own part in that world" (Norman Cousins. *Modern man is obsolete*. New York: Viking Press, 1945).

As human beings we do not like to accept destruction as inevitable or to feel that the biological and psychological man is obsolete, but to solve the socio-economic and sociopsychological problems or to control the trends in these fields, science must push back many frontiers and at the same time apply the scientific method to the results of its own discoveries. The physical, biological, and social sciences have made greater advancement in the past 50 years than during the preceding 50 centuries. The fact that the advance of science may be paralleled by public and personal moral decay is enough to challenge the most critical, especially if he has any interest in human society beyond his own laboratory or personal advancement.

Pure scientists must become human beings and not claim for themselves the right to be independent of all values. No one can question this as a requisite for advancement in science, but the maintenance of pure science does not excuse the scientist from applying his methods to the problems of human society. It is the belief of the present writer that the scientific method can be used in planning for the coming atomic age. The coal age, the petroleum age, the electric age were ushered in with no foresight. Hogben, in his *Retreat from reason*, has this to say: "We blundered into the age of coal and steel with no provision. We are now blundering on the threshold of an era of

technical changes which may have more drastic consequences" (p. 63). Scientific method has shown the way to extrapolate in dealing with physical and biological facts. This same method can be used in the social sciences to project an economic, social, and political organization that will meet man's external needs, especially in relation to the human values, health, love, emotional adjustment, and security.

Physical, biological, and social scientists can no longer remain compartmentalized. This applies to all types of problems whether they be those of housing and slum clearance, developments of more nutritious soya beans, or the cure and prevention of the development of millions of physical, mental, and emotional defectives such as were found by the draft. The defects of those from the Appalachian Highlands rejected by the draft should be studied by the economists, sociologists, psychologists, nutritionists, soil chemists, as well as specialists in public health.

The English scientists appear to be pointing the way along these lines; at least they are very much alive to the situation. Their general position, given in *Advance of science*, August 1943 and September 1944, two publications of the British Association for the Advancement of Science, are here presented.

Science, which is the search for truth, devotes itself to the study of the universe in which we live, "especially to the study of the natural processes by observation and experiment." But the truths that have been discovered through science have been directed away from the humanities. In fact, the natural sciences lost their place among the humanities "when the technological demands of modern institutionalism claimed for themselves a status apart from and alternative to the 'more humane' studies as it became the fashion to call them, in the hope of producing experts and specialists in some one line of lucrative research at the age of twenty-two or twenty-three" (Prof. Sir John L. Meyers, F.B.A.). Perhaps by reason of high specialization during the war years science, necessarily and with success, was turned to the augmentation of destruction. This had to be. Moreover, future historians will tell us how close Germany, through her technical power, came to destroying England and holding the European Continent.

From mature thinking, the British scientists have concluded that the function of science is to serve society in ways other than by providing machines and gadgets for commercial channels. They see a sphere of activity and service far beyond these limits. They hold that "there is no department of human activity that cannot be approached in the scientific spirit" (F. R. G. Duckworth). Recognizing the power of science, another wrote: "But now that science is on its way to a place in the sun, is there no risk of our

failing . . . to turn out balanced citizens? It seems to me that the risk is great—and all the greater because in these war years our energies have been rightly concentrated on practical ends—unless we are prepared to face the question squarely, what is the cultural value of science?"

Further conclusions provide a base for the scientist who is interested in the ills of humanity. "European civilization has not yet decided the exact form of the more social view of man to which it seems to be returning." In contrast to the authoritarian approach such as that pursued by the Nazi, "we should like to see clearly the development of an outlook which would continue to affirm the value of the individual while at the same time seeing him as a being formed by and forming the society of which he is a member . . . the sciences that treat man as a complete organism have been very little developed" (Dr. C. H. Waddington).

"The pivotal question of the postwar reconstruction is the ordinary living of the ordinary man. This is where the citizen meets science and has to meet problems of applied science most frequently and most urgently. But the central scientific subject . . . is most often overlooked and is the most important of all. I refer to the human. . . . According to the psychologists, no man is complete and healthy unless he has moral or ethical standards which he feels he can trust" (Mr. N. F. Sheppard).

The responsibilities of the scientists were recognized. "The time has now come when every scientist must realize how his work is related to social and economic conditions. It is clear, that as much as any class of workers, it will be even more evident that reconstruction, if it is to be successful and permanent, must be built within such a social framework that it is able to give to the community the full benefits which accrue from the work of the scientists. . . . We must make our work in the field of the social relations of science a living force of immediate effectiveness and value."

#### ACCEPTANCE OF RESPONSIBILITY

Many scientists of America are awake; they see the ills of human relations (intra- and international) and the dangers of aggravating those ills. Lawrence K. Frank pointed out (*Science*, 1945, 101, 433-434) that the major threat of our age is the discrepancy between advancing technology and our established practices and organizations. Dr. Harlow Shapley (*Harper's Magazine*, October 1945), aptly states that in Russia the conception of science is much broader than among us. There the social and historical sciences are on a par with the physical and biological sciences. Captain John G. Jenkins, USNR, in speaking on the subject, "New opportunities and new responsibilities



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the psychologist" (*Science*, 1946, 103, 33-38), asserts that psychology must of necessity enter "the age of social loyalty and social responsibility."

In the hearings on the establishment of a National Science Foundation, before the Subcommittee on War Mobilization of the Senate Committee on Military Affairs, recognition was given to the necessity for a unified approach to the problems of mankind. Dr. R. Moulton, Permanent Secretary of the American Association for the Advancement of Science, an eminent mathematician and astronomer, urged the necessity of including the social sciences in any program

involving the research of such a foundation. The testimony given in these hearings largely supported the position that the Government should support research in all fields of fundamental scientific inquiry. Then the President, in his message recommending legislation for scientific research, asked for the inclusion of the social sciences.

These are all straws pointing in the wind, but there are adverse currents. We who believe in the position taken in this discussion can only be satisfied when there are strong signposts telling exactly where we are going.

## Association Affairs

### Revision of the Association's Constitution

A Statement by the Special Committee on Constitution and Bylaws

Otis W. Caldwell, Burton E. Livingston (*Chairman*), and F. R. Moulton

AT A MEETING HELD 11 NOVEMBER 1945, the Executive Committee directed that the proposed revision of the Association's Constitution be republished in *Science* and that it be presented, as an amendment to the present Constitution, for ratification at a general session of the approaching fourth St. Louis meeting. It is here published for the second time, as it appeared in *Science* on 1 September 1944. The present Constitution was published in *Science* for 6 June 1941. It is published again here to facilitate comparison.

The original "Objects and Rules of the Association" were amended to become the First Constitution in 1851. A partial revision was made in 1856, and the second Constitution was ratified in 1874, at which time the Association was incorporated under the laws of the Commonwealth of Massachusetts. Prior to 1887, the Standing Committee of the Association controlled Association affairs, but in that year the Standing Committee became the Association Council. The Council has been the official governing body since that time.

In 1917 a special committee—consisting of J. McKeen Cattell, *chairman*, Herman L. Fairchild, and Daniel T. MacDougal—undertook a thorough revision of the Second Constitution. On recommendation of that Committee, the Third Constitution was ratified at the third St. Louis meeting. With a few minor amendments, it has been in force since 3 January 1920.

On 30 December 1939 the Executive Committee of the Council named a special committee to revise the Constitution still further. That committee consisted of B. E. Livingston, *chairman*, E. R. Long, and F. R. Moulton. On the resignation of Dr. Long in 1942, because of pressing duties connected with national defense and the war, the Executive Committee named Dr. O. W. Caldwell to succeed him. After intensive study of numerous suggestions and proposals, some of which had been brought forward in a prolonged discussion at the Dallas session of the Secretaries' Conference, this special committee presented a proposed new Constitution to the Executive Committee on 6 August 1944, recommending that this document be submitted for ratification at a general session of the approaching annual meeting for 1944, at Cleveland.

That recommendation was approved by the Council, but the proposed Fourth Constitution failed to receive a unanimous vote for ratification at the Cleveland general session when presented, although it received all but one of the votes that were recorded. It is therefore to be submitted again, this time to a general session at the next succeeding annual meeting, which will be the approaching St. Louis meeting. As before, it is to be proposed as an amendment to the present Third Constitution, which provides as follows:

ARTICLE 11. ALTERATION OF THE CONSTITUTION. *This Constitution may be amended at a general session by unanimous vote or by a majority vote at two consecutive annual meetings.*

A majority vote of approval at St. Louis would complete the act of ratification, and the new Constitution would then become effective one month thereafter. The proposed revision includes numerous changes of wording and some changes in the general organization of the Association, and amendments adopted from time to time in the last twenty-five years are duly incorporated. The special committee expects to undertake a thorough revision of the By-laws and Rules of Procedure if the new Constitution is ratified.

### The Proposed New Constitution

#### ARTICLE I—OBJECTS

The objects of the American Association for the Advancement of Science are to further the work of scientists, to facilitate cooperation among them, to improve the effectiveness of science in the promotion of human welfare, and to increase public understanding and appreciation of the importance and promise of the methods of science in human progress. The Association is a non-profit scientific and educational organization. It aims to conduct meetings and conferences of those interested in the various branches of science and education, to produce and distribute publications, to administer gifts and bequests as prescribed by the donors thereof, to provide support for research, to arrange awards for the accomplishment of scientific work, to cooperate with other organizations in the advancement of science and to engage in such other activities as shall have been authorized by the Council.

#### ARTICLE II—MEMBERS

*Section 1.* The membership of the Association shall consist of Annual Members, Life Members, Sustaining Members, Honorary Members and Emeritus Members. Admission to each of these five classes of membership shall be in accordance with the provision of Section 2 of this Article and with such relevant rules as the Council shall have prescribed. The Council may establish additional classes of membership.

*Section 2. (a) Annual Members.* Any person, institution or organization may be admitted to annual membership. Each Annual Member shall have such rights and privileges and shall pay such annual dues as the Council shall have prescribed.

*(b) Life Members.* Any person making to the Trust Funds of the Association a life-membership contribution of such amount as the Council shall have prescribed may be admitted to life membership. Each Life Member shall be exempt from the payment of annual dues and shall have all the privileges of an annual member throughout life.

*(c) Sustaining Members.* Any person making to the Trust Funds of the Association a sustaining-membership contribution of such amount as the Council shall have prescribed shall be the founder of a Sustaining Membership, which shall bear his name and shall be maintained in perpetuity as a trust. Each incumbent of a sustaining

membership shall have all the privileges of a life member. The first incumbent of a sustaining membership may be either the founder himself or another person named by him, as he may choose. On the death or resignation of an incumbent, the Executive Committee shall name another person to hold the membership throughout life.

*(d) Honorary Members.* Any person may be admitted to honorary membership under such conditions as the Council shall have prescribed. Each Honorary Member shall be exempt from the payment of annual dues and shall have all the privileges of an annual member throughout life.

*(e) Emeritus Members.* Any individual annual member may be admitted to emeritus membership under such conditions as the Council shall have prescribed. Each Emeritus Member shall be exempt from the payment of annual dues and shall have all the privileges of an annual member throughout life.

*Section 3. Fellows.* Any person who shall have made a meritorious contribution to science may become a Fellow of the Association, under such procedures for nomination and election as the Council shall have prescribed.

#### ARTICLE III—OFFICERS

*Section 1.* The officers of the Association shall be (a) General Officers, elected from among the Fellows by ballot of the Council, and (b) Administrative Officers, elected by the Executive Committee as prescribed in Section 3 of this Article.

*Section 2. General Officers.* The general officers of the Association shall be a President Elect, a President, a Retiring President, and a Vice President for each Section. The term of office of the general officers shall be one year. The term of office of the President Elect and of the Vice Presidents shall begin on the January fifteenth following their election. At the close of the one-year term of the President Elect he shall become President, and at the close of the one-year term of the President he shall become Retiring President. In the event of a vacancy in the office of President, the President Elect shall become President. In the event of a vacancy in the office of President Elect, the Executive Committee shall make a *pro tempore* appointment to hold until the vacancy shall have been filled by ballot of the Council. In the event of a vacancy in the office of Vice President, the Executive Committee shall fill the vacancy by appointment.

*Section 3. Administrative Officers.* The administrative officers shall be an Administrative Secretary, an Assistant Administrative Secretary, a General Secretary, a Treasurer, and a Secretary of each Section. The term of office of each administrative officer shall be four years or a shorter term if so determined by the Executive Committee. Unless otherwise determined at the time of his election, his term shall begin on the January fifteenth following his election. The Administrative Secretary, the Assistant Administrative Secretary, the General Secretary and the Treasurer shall be elected by the Executive Committee. The Secretaries of the Sections shall be nominated from among the Fellows by the respective Sections.



March 1, 1946

committees and elected by the Executive Committee. In the event of a vacancy in the office of an administrative officer, the Executive Committee shall fill the vacancy for the remainder of the unexpired term. Additional administrative officers may be authorized by the Council, to be elected or appointed by the Executive Committee according to such rules and for such terms as the Council shall have determined in each instance.

#### ARTICLE IV—COUNCIL

*Section 1.* Control of all affairs of the Association is vested in the Council, which shall have power to review and to amend or rescind its own actions and all actions taken by the Executive Committee or by other agents to whom powers are delegated by this Constitution or shall have been delegated by the Council. The Council shall enact such bylaws as it may deem desirable, each of which shall remain in force until amended or rescinded by action of the Council.

*Section 2.* The Council shall consist of (a) the President Elect, the President, the Retiring President, the Vice Presidents, the Secretaries of the Sections, the Administrative Secretary, the General Secretary, the Treasurer and the eight elected members of the Executive Committee; (b) one Fellow elected by each regional Division of the Association; and (c) the representatives of affiliated organizations, as provided for in Article VII, Section 2, of this Constitution. Each Council member shall serve until his successor shall have taken office. The President shall be chairman of the Council; if the President shall be unable to serve as chairman at any session, the Council members in attendance shall elect a chairman for that session. Twenty members of the Council shall constitute a quorum for the transaction of business.

*Section 3.* There shall be an Executive Committee of the Council, which shall execute such commitments as the Council may direct and shall make recommendations to the Council. Subject to this Constitution, to the bylaws, and to specific actions by the Council, the Executive Committee shall have power to act for the Council when the Council is not in session. At each annual meeting of the Association the Executive Committee shall render to the Council a report on actions taken by the Committee for the Council. The Executive Committee shall consist of thirteen members: the President Elect, the President, the Retiring President, the Administrative Secretary, the General Secretary, and eight Fellows elected by ballot of the Council, two each year for a term of four years. At any election of members of the Executive Committee, not more than one Fellow serving his fourth consecutive year as an elected member may be re-elected. In the event of a vacancy in the office of an elected member of the Executive Committee, his successor for the remainder of the unexpired term shall be elected from among the Fellows by ballot of the Council at the next annual election. Six members of the Executive Committee shall constitute a quorum for the transaction of business. The Retiring President of the Association shall be chairman of the Executive Committee; if he shall be unable to serve at any session of the Committee, the Committee members in attendance shall elect a chairman for that session.

*Section 4.* There shall be a Finance Committee, consisting of the Treasurer, the Administrative Secretary, and four members elected by the Executive Committee, one each year for a term of four years. The Finance Committee shall advise the Treasurer regarding purchases and sales of securities for the Association. Upon request of the Executive Committee, the Finance Committee shall make recommendations to the Executive Committee regarding financial questions. The Finance Committee shall report its actions annually to the Executive Committee. The Chairman of the Finance Committee shall be one of its elected members, appointed by the Executive Committee to serve throughout his term of membership in the Finance Committee. Any vacancy in the Finance Committee shall be filled by the Executive Committee. Four members of the Finance Committee shall constitute a quorum for the transaction of business.

*Section 5.* The term of office of each of the eight elected members of the Executive Committee and of each of the four appointed members of the Finance Committee shall begin on the January fifteenth following his election or appointment, and each shall serve until his successor shall have taken office.

*Section 6.* The Council may establish additional committees, each of which shall include at least two members of the Council and shall stand until discharged. Such additional committees shall report to the Council at each annual meeting unless otherwise directed at the time of their establishment.

#### ARTICLE V—SECTIONS

*Section 1.* The Association shall consist of fifteen Sections, designated as follows: Mathematics (A), Physics (B), Chemistry (C), Astronomy (D), Geology and Geography (E), Zoological Sciences (F), Botanical Sciences (G), Anthropology (H), Psychology (I), Social and Economic Sciences (K), History and Philosophy of Science (L), Engineering (M), Medical Sciences (N), Agriculture (O), and Education (Q). Additional sections or subsections may be established by vote of the Council. Each member of the Association may designate the section in which he wishes to be enrolled and may designate one additional section in which he is interested.

*Section 2.* The Vice President for a Section shall be *ex officio* chairman of that Section.

*Section 3.* The affairs of each Section shall be managed by a Section Committee consisting of (a) the Chairman and the Secretary of the Section; (b) other members of the Council who are primarily enrolled in the Section; and (c) four Fellows, one elected each year by the Section Committee for a term of four years. No person shall serve concurrently in more than one Section Committee. If an elected member of a Section Committee shall have resigned or died, his successor for the remainder of the unexpired term shall be elected from among the Fellows by the Executive Committee, from nominations made by the Section Committee. One-third of the members of a Section Committee shall constitute a quorum for the transaction of business.

*Section 4.* The Section Committee of each Section

shall promote the work of the Association in its own field and may organize subcommittees for that purpose. It shall arrange such section programs as it shall deem desirable for meetings of the Association, either separately or in cooperation with other sections of the Association or with independent societies. With the approval of the Executive Committee, a Section Committee may arrange section meetings to be held at places and times other than those of Association meetings.

#### ARTICLE VI—DIVISIONS AND BRANCHES

*Section 1.* Regional Divisions and Local Branches of the Association may be authorized by vote of the Council, for the purpose of promoting the work of the Association in their respective territories.

*Section 2.* Each Regional Division or Local Branch shall elect its officers for such terms as it shall prescribe and shall hold its meetings and conduct its affairs as it shall deem desirable, subject to the relevant provisions of this Constitution and of the Bylaws of the Association, and to such special provisions as the Council of the Association shall have established.

#### ARTICLE VII—AFFILIATED AND ASSOCIATED ORGANIZATIONS

*Section 1.* To facilitate cooperation between the Association and other organizations, and among the latter, the Council may elect an organization to be an officially affiliated or an officially associated academy or society.

*Section 2.* Each organization elected to be an Affiliated Society shall be entitled to name one Fellow of the Association to represent it in the Council; if it has more than one hundred members who are Fellows of the Association, it shall be entitled to name an additional Fellow of the Association to represent it in the Council.

#### ARTICLE VIII—MEETINGS

*Section 1.* The Association shall hold an annual meeting each year at such time and place as the Council shall have determined. Other meetings of the Association or of its sections may be authorized by the Council.

#### ARTICLE IX—PUBLICATIONS

*Section 1.* Summarized Proceedings of the Association and Directories of its Officers and Members shall be published at such times and in such manner as the Council shall have directed. By authorization of the Council, the Association may arrange for the production and distribution of journals, books, and other publications.

#### ARTICLE X—FUNDS

*Section 1.* Funds of the Association shall be classified as Current Funds, Investment Funds, and Trust Funds.

(a) *Current Funds* shall include all dues of annual members, all receipts from publications and all other funds received in the continuing operations of the Association.

(b) *Investment Funds* shall include all gifts and bequests received without special restriction concerning the use to be made of principal and income, and all other

funds designated by the Council as investment funds. Investment Funds shall be invested in securities or other properties or held in cash while awaiting investment. Both principal and income of Investment Funds may be used for any purpose, but only after specific appropriations by the Council.

(c) *Trust Funds* shall consist of all life-membership contributions, all sustaining-membership contributions, all funds appropriated by the Council for establishing special life memberships, all gifts and bequests accepted with specific restrictions prohibiting their allotment to either Current Funds or Investment Funds, and all other funds designated by the Council as Trust Funds. Trust funds shall be invested in securities or other income-producing properties, or held in cash while awaiting investment. The principal of every trust fund shall be maintained in perpetuity unless otherwise originally provided by the donor thereof or by the Council. Income from a trust fund shall be used only after special appropriation by the Council. Income from trust funds received as gifts or bequests may be appropriated only for purposes prescribed by the donors thereof, and income from other trust funds, except individual life-membership contributions while the contributors thereof are living, may be appropriated only for the support of research unless otherwise prescribed by the Council when the funds were established. It is provided that income from individual life-membership contributions may be appropriated by the Council for any purpose so long as the respective contributors are living.

*Section 2.* The Administrative Secretary shall be custodian of all Current Funds, which he shall collect and disburse under the direction of the Executive Committee. He shall collect life-membership and sustaining-membership contributions and shall transfer them to the Treasurer for allocation to Trust Funds. Every check issued by the office of the Administrative Secretary shall bear two signatures, those of the Administrative Secretary and the Assistant Administrative Secretary or those of the Treasurer and either the Administrative Secretary or the Assistant Administrative Secretary. The Administrative Secretary, the Assistant Administrative Secretary and the Treasurer shall be bonded in favor of the Association for such amounts as the Executive Committee shall have determined.

*Section 3.* The Treasurer shall be custodian of all Investment Funds, all Trust Funds, and all other funds placed in his charge by action of the Council. He shall administer gifts and bequests in accordance with such provisions as shall have been made by the donors thereof. Unless otherwise directed by the Council, he shall sell securities from the investment portfolio of the Association, and purchase securities for the investment portfolio, in accordance with such advice of the Finance Committee as shall have been formally recorded in the minutes of its meetings. He shall collect the income of all funds in his charge and shall dispose of it as directed by the Council. Every check issued by the office of the Treasurer shall bear two signatures, that of either the Treasurer or the Chairman of the Finance Committee and that of either



the Administrative Secretary or the Assistant Administrative Secretary.

#### ARTICLE XI—RATIFICATION AND AMENDMENTS

*Section 1.* This Constitution shall become effective one month after it shall have been ratified in accordance with the procedure established for amending the Constitution of 1919. It shall invalidate the Constitution of 1919 and all amendments thereto.

*Section 2.* To become effective, any proposed amendment to this Constitution shall be approved by the Executive Committee, published in the official journal of the Association at least one month prior to an annual meeting of the Association, and ratified either (a) by a nine-tenths vote of the Council members present in a Council session of that meeting or (b) by a two-thirds vote of the Council members present in each of two Council sessions held at consecutive annual meetings of the Association. Ratified amendments shall be published promptly in the official journal of the Association and shall become effective one month after ratification.

#### The Present Constitution

In force since January 3, 1920<sup>1</sup>

#### ARTICLE 1—OBJECTS

The objects of the Association are to promote intercourse among those who are cultivating science in different parts of America, to cooperate with other scientific societies and institutions, to give a stronger and more general impulse and more systematic direction to scientific research, and to procure for the labors of scientific men increased facilities and a wider usefulness.

#### ARTICLE 2—MEMBERSHIP

Persons willing to cooperate in the work of the Association may be elected to be members by the Council. Members who are professionally engaged in scientific work or who have advanced science by research may be elected to be fellows. *The Council shall fix the admission fees and dues (Dec. 27, 1934).* A member who pays at one time the sum of one hundred dollars to the Association becomes a life member and is exempt from further dues. A person who gives one thousand dollars to the Association may be elected to be a sustaining member and is exempt from further dues.

#### ARTICLE 3—OFFICERS

The officers of the Association shall be elected by ballot by the Council, and shall consist of a President, a Vice President from each Section, a Permanent Secretary, a General Secretary, a Treasurer and a Secretary of each Section. The President and the Vice Presidents shall be elected for one year, the other officers for four years. The officers shall perform the usual duties of these offices, under the direction of the Council.

<sup>1</sup> From Summarized Proceedings, 1934-40, pages 61, 62. Amendments adopted since 1920 are shown in italics, with dates of their adoption in parentheses.

#### ARTICLE 4—COUNCIL

The Council shall consist of the President, the Vice Presidents, the Permanent Secretary, the General Secretary, the Secretaries of the Sections, and the Treasurer, *the members of the Executive Committee, ex officio, if they are not otherwise members of the Council (Dec. 27, 1923),* of one fellow elected by each *division, affiliated state academy, and (Dec. 27, 1932) affiliated society,* and one additional fellow from each affiliated society having more than 100 members who are fellows of the Association, and of eight fellows, two elected annually by the Council for a term of four years. There shall be an Executive Committee of the Council, consisting of the President, the Permanent Secretary, the General Secretary and eight members elected by the Council, two annually for a term of four years, who shall be *ex officio* members of the Council. The Council may appoint standing or temporary committees to make reports, to assist in the conduct of the work of the Association and to promote its objects.

#### ARTICLE 5—SECTIONS

The Association shall be divided into the following Sections: A, Mathematics; B, Physics; C, Chemistry; D, Astronomy; E, Geology and Geography; F, Zoological Sciences; G, Botanical Sciences; H, Anthropology; I, Psychology; K, Social and Economic Sciences; L, Historical and Philological Sciences; M, Engineering; N, Medical Sciences; O, Agriculture; P, *Industrial Science (Dec. 28, 1936);* Q, Education. Members of the Association shall be members of that Section or of those Sections under which their work or their interests fall. Members of the Section shall nominate to the Council a Chairman, who becomes *ex officio* a Vice President of the Association and whose term of office shall be one year, and a Secretary, whose term of office shall be four years. These officers, together with four fellows, one elected annually by the Section for a term of four years, and the representatives on the Council of affiliated societies in the same field shall form a Sectional Committee. This Committee shall arrange the scientific programs of the meetings and may form sub-sections or hold joint meetings with other sections or other societies. It may appoint committees and shall in all ways promote the objects of the Association within its own field.

#### ARTICLE 6—DIVISIONS AND BRANCHES

Regional Divisions and Local Branches of the Association may be formed by vote of the Council. Such Divisions and Branches may elect officers, hold meetings, appoint committees, enter into relations with other societies and promote within their fields the objects of the Association.

#### ARTICLE 7—ASSOCIATED AND AFFILIATED SOCIETIES

National and local scientific societies may by vote of the Council, become associated with the Association. Those Associated Societies which the Council shall designate as Affiliated Societies shall be represented on the Council and on the Sectional Committees as provided in Articles 4 and 5.

## ARTICLE 8—MEETINGS

The Association shall hold an annual meeting at such time and place as may be determined by the Council. Other meetings of the Association and of the Sections may be authorized by the Council. The Divisions and the Branches may hold annual and other meetings.

## ARTICLE 9—PROCEEDINGS

The proceedings of the Association and the list of officers and members shall be published in such manner as the Council may direct.

## ARTICLE 10—FUNDS

The Permanent Secretary shall collect the annual dues and make expenditures as directed by the Council. The

Treasurer shall deposit or invest the permanent funds of the Association, as provided for trust funds by the laws of the state of Massachusetts or the state of New York. Bequests and gifts will be administered in accordance with the provisions of the donors. The payments from sustaining and life members form part of the permanent fund, and the income (after the death of the member) shall be used for research, unless otherwise directed by unanimous vote of the Council or by a majority vote at two consecutive annual meetings.

## ARTICLE 11—ALTERATION OF THE CONSTITUTION

This Constitution may be amended at a general session by unanimous vote or by a majority vote at two consecutive annual meetings.

## Audit of Financial Records of the Association for 1944

F. R. Moulton

*Permanent Secretary, AAAS, Washington, D.C.*

Demands on certified accountants for reports of financial operations related to the war and income taxes have been so heavy that only on 21 January 1946 did the Association receive the report of the audit of its books for the calendar year 1944, which is printed in full below. In recent months conditions have improved and it is expected that the audit of the books of the Association for 1945 will be started in April or May 1946.

In reading the following report of the audit of the books of the Association by G. P. Graham & Company, certified public accountants, it will be well to bear in mind that the endowments and other permanent funds of the Association are in the Treasurer's account and almost completely independent of the general operations of the Association. The audit of the general operations of the Association is presented under the heading "Office of the Permanent Secre-

tary." This is the part of the report that will be of greatest interest to most members and it can be read understandingly quite independently of what precedes it.

The first tabulation in both the Treasurer's accounts and those of the Office of the Permanent Secretary is the Balance Sheet, which presents in clear and condensed form the condition of the respective accounts at the close of the year. The statement of Income and Expense in the report on the Office of the Permanent Secretary is a concise statement of the financial operations of the general offices of the Association during the calendar year 1944. The "Comments" which precede the auditor's principal tabular reports contain important supplementary information about the financial operations of *The Scientific Monthly*, the payments toward the purchase of *Science*, and the AAAS-Gibson Island Research Conferences.

January 21, 1946

*The American Association for the  
Advancement of Science  
Washington, D. C.*

We have audited the financial records of your Treasurer's office and of your Permanent Secretary's office for the year ended December 31, 1944, and submit herewith our report consisting of exhibits and schedules (A-G) together with comments thereon.

### COMMENTS

The accounting records of the American Association for the Advancement of Science are kept at the general offices of the Association in the Smithsonian Institution Building, Washington, D. C., and consist of two separate sets of accounts. The records relating to the Treasurer's office include the details of all investments owned by the Association, income received therefrom, the disbursement of such income and a



complete record of all endowment funds of the Association. Certain funds of the AAAS-Gibson Island research conferences are handled through the Treasurer's cash records but for the purposes of this report these items are shown separately.

The accounts of the Permanent Secretary's office reflect the general operations of the Association and include the record of membership dues paid, sales of publications and expenditures authorized by the Council or Executive Committee.

#### *Treasurer's Accounts*

The cash balances recorded in the Treasurer's accounts were carried with the following banks located in the District of Columbia:

American Security and Trust Company	
Checking account .....	\$30,117.21
Less: Funds of AAAS-Gibson Island research conferences .....	6,329.32
	<u>\$23,787.89</u>
Savings account .....	7,500.00
Hamilton National Bank	
Savings account .....	1,500.00
Washington Loan and Trust Company	
Savings account .....	2,500.00
	<u>\$35,287.89</u>

Securities owned by the Association are listed in detail in Schedule B-1. Separate investment accounts are not carried for the individual endowment and reserve funds of the Association, but all investments are pooled into one account and the total income received is apportioned to the various funds on the basis of its total investment in the pool account.

During the year under review income received from investments amounted to \$4,832.61 and was apportioned as follows:

For general purposes .....	\$1,736.36
For research .....	2,139.40
A. G. Stillhamer fund .....	65.24
Jane M. Smith fund .....	92.30
Luella A. Owen fund .....	9.18
Treasurer's reserve fund .....	790.13
	<u>\$4,832.61</u>

Ordinarily the Treasurer's reserve fund account is adjusted to reflect the losses or gains from sales of securities, but where particular securities were received as a part of a fund, the principal of the fund has been adjusted to reflect the gain or loss from the disposition of such securities. During the year under review the Hector E. Maiben fund was increased by \$3,498.58 representing the excess of the amounts received from the D. F. Schwegman and Otto Balz notes over the amounts at which they were carried on the books.

Other changes in endowment and reserve funds during the year were as follows:

#### *Treasurer's reserve fund*

Balance January 1, 1944 .....	\$42,782.71
Add: Income apportionment .....	790.13

\$43,572.84

Deduct: Net loss on securities .....	6,303.53
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Balance December 31, 1944 .....	<u>\$37,269.31</u>
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#### *Fees of deceased life members*

Balance January 1, 1944 .....	\$21,650.00
Add: Fees of regular life members who died during year .....	1,150.00

Balance December 31, 1944 .....	<u>\$22,800.00</u>
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#### *Fees of living life members*

Balance January 1, 1944 .....	\$47,850.00
Add: Fees received during year .....	3,500.00

\$51,350.00

Deduct: Fees of deceased life members

Regular—Transferred to fees of deceased life members .....

Emeritus—Transferred to income account of Jane M. Smith fund and made available for creation of new emeritus life memberships .....

1,400.00	2,550.00
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Balance December 31, 1944 .....	<u>\$48,800.00</u>
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#### *Friends of the Association*

Balance January 1, 1944 .....	\$ 3,559.00
Add: Gift of John S. Wright .....	100.00

Balance December 31, 1944 .....	<u>\$ 3,659.00</u>
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There were no changes in the prize fund during the year. This fund represents amounts contributed for the thousand dollar prize.

The academy grants unpaid include the balances of grants made for the years 1941, 1942, 1943 and 1944 which were not paid as at December 31, 1944. These balances may be summarized by years as follows:

1941 .....	\$ 92.94
1942 .....	267.00
1943 .....	648.00
1944 .....	1,255.00
Total .....	<u>\$2,262.94</u>

The special research fund represents an amount received from Dr. Elihu Grant in 1941 for research work and which was unexpended as at December 31, 1944.

Accumulated income unappropriated as at December 31, 1944, included income received from investments during the year under review which was available for research and for general purposes in the fiscal year 1945; unexpended balance of previous years, the total of which is available at any time;

and the accumulated income of restricted funds which is available for the following purposes:

Jane M. Smith fund—For emeritus life members  
Luella A. Owen fund—For emeritus annual members  
A. G. Stillhamer fund—For grants in biology

On January 1, 1944, the unexpended balances of previous years amounted to ..... \$6,770.22  
To this has been added the excess of revenue over expenditures for the year ending December 31, 1944, determined as follows:

Income available for research and for general purposes .....	\$2,985.98		
Less: Academy research grants .....	\$2,538.50		
General expense .....	24.00	2,562.50	423.48
making a total unexpended balance available as at December 31, 1944, amounting to ..... <u>\$7,193.70</u>			

#### *Permanent Secretary's Accounts*

The cash in banks as recorded on the accounts of the Permanent Secretary were as follows:

American Security and Trust Company	
Checking account .....	\$153,465.09
Savings account .....	26,256.22
	<u>\$179,721.31</u>

Accounts receivable as at December 31, 1944, included amounts due for the following:

<i>Scientific Monthly</i> advertising .....	\$ 100.68
<i>Science</i> advertising .....	10,147.19
<i>Science</i> nonmember subscriptions .....	4,220.77
	<u>\$14,468.64</u>

Inventories of supplies on hand were made under the supervision of officers of the Association and were not verified by us.

Deferred charges include expenses of \$2,517.02 incurred in preparing certain invitations to prospective members which will be charged in 1945, and the net expense of the *Science* series publications to December 31, 1944.

Accounts payable as at December 31, 1944, represented the following:

<i>Scientific Monthly</i> expense .....	\$ 4,392.03
<i>Science</i> expense .....	5,578.00
<i>Bulletin</i> .....	602.60
1944 inflation allowance on annuity .....	4,165.00
Miscellaneous expense .....	271.84
	<u>\$15,009.47</u>

As at January 1, 1944, life membership fees received by the Permanent Secretary and not remitted to the Treasurer amounted to ..... \$2,100.00  
Fees received during the year 1944 were ..... 3,900.00  
A total of ..... \$6,000.00  
Remittances made to the Treasurer during 1944 amounted to ..... 3,500.00  
leaving a balance due to the Treasurer as at December 31, 1944, in the amount of ..... \$2,500.00

Deferred income includes amounts received from members for dues and fees for years subsequent to 1944 and for prepaid 1945 journal subscriptions.

The summarized proceedings reserve represents the amounts received from sales of the proceedings, together with funds provided in prior years for publication costs, less amounts expended for publication and distribution of the proceedings.

The reserve for symposia publications is the excess of the total amount received from the sales of the publication over the disbursements for publication costs, distribution and other expenses. These receipts and disbursements are not included in the statement of income and expenses of the Permanent Secretary's office.

Unallocated funds of the Permanent Secretary's office represents the general surplus of the Association. An analysis of this account for the year under review is shown in Exhibit A.

The indenture referred to sets forth the manner in which the amount of the annuity payments over a period of ten years and the inflation allowances thereon would be determined. As at December 31, 1944, the exact amount of the annuity had not been determined and the amounts paid during 1944 were based on amounts agreed to in a supplemental agreement which further provided that the amount paid in 1944 would be adjusted after final determination had been made as to the amount of the annuity payments.

Amounts paid or accrued in 1944 on the annuity and the inflation allowance amounted to \$21,165.00 and the correct amounts due were as follows:

Annuity payment .....	\$15,718.42	
Inflation allowance .....	3,851.02	19,569.44
The 1944 overpayment of .....		<u>\$ 1,595.56</u>

was deducted from the 1945 annuity payments.

The total amount payable on the annuity was determined to be \$166,430.69 and to the amounts payable each year will be added any amount which may be due under the inflation clause as set forth in the original indenture dated December 12, 1938.

In 1943 the Association purchased the journal *The Scientific Monthly* for a cash payment of \$9,499.59



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March 1, 1946

## SCIENCE

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and the books of the Association do not reflect the value of that journal nor the value of the journal *Science* which was acquired in 1944. No liability has been set up for the additional amounts payable on the annuity.

As at December 31, 1944, claims of Mr. Ware Cattell and Dr. Charles S. Stephenson were pending against the Association. In January, 1945, Mr. Cattell was paid \$7,500.00 from unallocated funds of the Permanent Secretary in full settlement of his claim. We have been advised that the amount of the liability, if any, under the claim of Dr. Stephenson has not been determined.

### AAAS-Gibson Island Research Conferences

The Association owns certain property on Gibson Island, Maryland, which was acquired in 1941 and is used for summer conferences. The cost of this property and subsequent additions and improvements was paid from funds contributed to the Association for that purpose and none of the general funds of the Association have been used on this project. A balance sheet of the AAAS-Gibson Island research conferences as at December 31, 1944, is shown (Exhibit F) and there is a statement of income and expense for the year ended December 31, 1944 (Exhibit G).

As previously stated certain funds of the AAAS-Gibson Island research conferences are handled through the Treasurer's account, and the cash in bank as shown on the balance sheet was on deposit in that account on December 31, 1944. However, the actual receipt of income and certain of the disburse-

ments were handled by the Director at Gibson Island and the remaining balance was deposited in the Treasurer's account. The statement of income and expense set forth (Exhibit G) was prepared from statements submitted by the Director of amounts received and disbursed by him together with amounts disbursed from the Treasurer's account.

### General

The cash balances as shown were reconciled with statements submitted by the various depositories. The securities owned by the Association are carried in a safe deposit box at the American Security and Trust Company and were inspected by us subsequent to December 31, 1944. All changes in securities since the above date have been reviewed by us and the securities which were on hand December 31, 1944, have been properly accounted for.

During the course of the audit we examined or tested the accounting records and other supporting evidence by methods and to the extent we deemed appropriate, but did not make a detailed audit of the transactions.

Subject to the above comments, we are of the opinion that the statements present fairly the financial condition of the American Association for the Advancement of Science as at December 31, 1944, and the results of its operations for the year ended on that date.

Respectfully submitted,

G. P. GRAHAM & COMPANY  
Certified Public Accountants

Washington, D. C.

## Appendix

### Exhibit A

Balance as at January 1, 1944 .....		\$29,482.18
Add:		
Excess of income over expenses for year (See Exhibit E) .....		57,760.95
		<u>\$87,243.13</u>
Deduct:		
Amounts paid or accrued in 1944 under indenture dated December 12, 1938, providing for pur- chase of the journal <i>Science</i>		
Annuity payments January 20 to December 31, 1944 .....	\$17,000.00	
Inflation allowance on annuity .....	4,165.00	
Adjustments of 1944 subscriptions to <i>Science</i> ..	19,675.91	\$40,840.91
		<u>8.00</u>
Prior year adjustment .....		40,848.91
Balance as at December 31, 1944 .....		<u><u>\$46,394.22</u></u>

## Exhibit B

## TREASURER'S ACCOUNTS

Balance Sheet as at December 31, 1944

## Assets

Endowment and reserve funds		
Cash awaiting investment .....	\$ 18,108.22	
Securities .....	243,720.21	\$261,828.43
		<hr/>
Cash for current purposes .....		17,179.67
		<hr/>
		\$279,008.10

## Liabilities and Reserves

Endowment and reserve funds			
For research			
Richard T. Colburn fund .....	\$87,186.45		
Fees of deceased sustaining members .....	7,000.00		
Fees of deceased life members .....	22,800.00	\$116,986.45	
For general purposes			
W. Hudson Stephens fund .....	\$ 4,381.21		
Michael P. Rich fund .....	10,000.00		
Hector E. Maiben fund .....	30,707.46		
Friends of the Association .....	3,659.00		
Jennie M. Arms—Sheldon fund .....	1,000.00		
Fees of living life members .....	48,800.00	98,547.67	
For special purposes			
Jane M. Smith fund .....	\$ 5,000.00		
Luella A. Owen fund .....	500.00		
A. G. Stillhamer fund .....	3,525.00	9,025.00	
Treasurer's reserve fund .....		37,269.31	\$261,828.43
Current liabilities			
Prize fund .....	\$ 2,000.00		
Academy grants .....	2,262.94		
Special reserve fund .....	100.00	\$ 4,362.94	
Accumulated income unappropriated			
For research .....	\$ 2,139.40		
For general purposes .....	1,736.36		
Jane M. Smith fund .....	1,525.30		
Luella A. Owen fund .....	10.58		
A. G. Stillhamer fund .....	211.39		
Unexpended balances of previous years .....	7,193.70	12,816.73	17,179.67
			<hr/>
			\$279,008.10



## Schedule B-1

Statement of Securities Owned as at  
December 31, 1944

	Book Value
<i>United States bonds</i>	
\$10,000 U. S. Savings, Series D, Feb., 1950 .....	\$ 8,300.00
40,000 U. S. Savings, Series F, June, 1954 .....	29,960.00
50,000 U. S. Treasury $\frac{1}{2}$ % Certificates, Feb., 1945 .....	50,000.00
40,000 U. S. Treasury $\frac{1}{2}$ % Certificates, June, 1945 .....	40,000.00
10,000 U. S. Treasury $\frac{1}{2}$ % Certificates, Dec., 1945 .....	10,000.00
40,000 U. S. Treasury 2% 1952/54 .....	40,000.00
<i>Other bonds</i>	
\$42,000 Pittsburgh, Shawmut and Northern Railroad 4% 1952 .....	4,200.00
2,805 Nebraska State Fair Grand Stand Debentures 5% 1939 .....	2,812.50
<i>Stocks</i>	
50 Sh. Eastman Kodak Company .....	8,455.59
100 Sh. General Motors Corporation .....	4,415.92
100 Sh. International Harvester Company .....	5,920.42
100 Sh. G. C. Murphy Company— $4\frac{1}{2}$ % Preferred .....	10,500.00
100 Sh. Procter and Gamble Company .....	4,955.01
200 Sh. Standard Oil Company of Indiana .....	5,586.25
100 Sh. Swift and Company .....	2,309.62
100 Sh. United Fruit Company .....	7,725.89
100 Sh. Wm. Wrigley, Jr., Company .....	6,785.51

(Continued, column 2)

## Mortgage participation certificates

\$1,000 Sigma Phi Epsilon Building Association .....	982.50
1,000 Edward Mackey .....	811.00
	<u>\$243,720.21</u>

## Exhibit C

## TREASURER'S ACCOUNTS

Statement of Receipts and Disbursements  
Year Ended December 31, 1944

Cash balances January 1, 1944 .....	\$111,586.35
<i>Receipts</i>	
Interest and dividends received .....	\$ 4,832.61
Contributions for grants to academies .....	300.00
Sale and redemption of securities .....	74,295.47
Gift from John S. Wright for endowment fund .....	100.00
Life membership fees .....	3,500.00
	<u>83,028.08</u>
	<u>\$194,614.43</u>
<i>Disbursements</i>	
<i>Grants</i>	
Academy research grants .....	\$ 1,651.06
Grants from contributions .....	300.00
Miscellaneous expenses .....	24.00
Securities purchased .....	157,351.48
	<u>159,326.54</u>
Cash balances December 31, 1944	
For investment .....	\$ 18,108.22
For current purposes .....	17,179.67
	<u>\$ 35,287.89</u>

## Exhibit D

## OFFICE OF THE PERMANENT SECRETARY

## Balance Sheet as at December 31, 1944

## Assets

<i>Current assets</i>			
Cash in banks .....	\$179,721.31		
Accounts receivable .....	14,468.64		
Inventories of supplies			
Office supplies .....	\$ 50.00		
Postage .....	1,182.46		
Printing and stationery .....	771.34	2,003.80	196,193.75
<i>Deferred charges</i>			
Circularization .....	\$ 2,517.02		
Science series publications (Net) .....	462.73	2,979.75	
		<u>\$199,173.50</u>	

## Liabilities

<i>Current liabilities</i>			
Accounts payable .....	\$ 15,009.47		
Treasurer's account (Life membership fees) .....	2,500.00	\$ 17,509.47	
<i>Deferred income</i>			
Prepaid dues and fees .....	\$108,210.25		
Prepaid subscriptions—1945			
Science—Special membership subscriptions .....	\$ 1,119.00		
The Scientific Monthly			
Special membership subscriptions .....	3,540.00		
Nonmember subscriptions .....	7,348.36	12,007.36	120,217.61
<i>Reserves</i>			
Summarized proceedings .....	\$ 5,611.90		
Symposia publications .....	9,440.30	15,052.20	
Unallocated funds .....		46,394.22	
		<u>\$199,173.50</u>	

## Exhibit E

## OFFICE OF THE PERMANENT SECRETARY

## Statement of Income and Expense for the Year Ended December 31, 1944

## Income

Dues of annual members			
Current year .....	\$118,085.00		
Arrearages for one year .....	1,135.00		
Other arrearages .....	220.00	\$119,440.00	
Entrance fees .....		35.00	
Interest on bank accounts .....		143.15	
Journal subscriptions (from Treasurer)			
Life members .....	\$ 1,656.00		
Fifty-year members .....	63.00		
Emeritus annual members .....	21.00	1,740.00	\$121,358.15

## Expenses

Office of the Permanent Secretary			
Salaries .....	\$ 23,765.83		
Office and addressograph supplies .....	245.01		
Postage .....	2,043.53		
Printing and stationery .....	1,278.45		
Telephone and telegraph .....	193.24		
Exchange on foreign checks .....	163.12		
Express, freight and drayage .....	8.93		
Miscellaneous expenses .....	666.09	\$ 28,364.20	
General Secretary's office .....		326.82	
Bulletin .....		3,556.90	
Circularization .....		3,166.31	
Allowances to divisions .....		3,277.00	
Secretaries' conferences .....		703.04	
Cleveland meeting .....		3,217.07	
Travel expenses .....		827.54	
Journals			
The Scientific Monthly (See Schedule E-1) .....	\$ 20,580.37		
Science (See Schedule E-2) .....	- 422.05	20,158.32	63,597.20
Excess of income over expenses .....			\$ 57,760.95

## Schedule E-1

## THE SCIENTIFIC MONTHLY

## Statement of Income and Expense for the Year Ended December 31, 1944

## Income

Advertising .....	\$ 3,405.89		
Special membership subscriptions .....	3,505.00		
Nonmember subscriptions .....	10,320.43		
Miscellaneous sales .....	972.10	\$ 18,203.42	

## Expenses

Printing, binding and mailing .....	\$24,771.22		
Authors' reprints .....	769.31		
Copyrights .....	22.00		
Photographs and engravings .....	13.92	\$ 25,576.45	
Salaries .....	\$ 8,164.79		
Postage .....	93.61		
Stationery and supplies .....	178.84		
Telephone and telegraph .....	155.06		
Express .....	18.67		
Travel .....	5.19		
Binding volumes .....	142.50		
Subject file of articles published .....	72.90		
Miscellaneous expenses .....	50.60	8,882.16	
Subscription clerical expense .....		1,574.48	
Subscription service at Science Press .....		2,393.62	
Requests to members for back numbers .....		357.08	38,783.79
Excess of expenses over income .....			\$ 20,580.37



## SCIENCE

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## Schedule E-2

## SCIENCE

## Statement of Income and Expense for the Year Ended December 31, 1944

## Income

Advertising .....	\$ 56,887.23
Special membership subscriptions .....	1,122.00
Nonmember subscriptions .....	16,042.46
Miscellaneous sales .....	28.10
	<u>\$ 74,079.79</u>

## Expenses

Printing, binding and mailing .....	\$50,871.14
Salaries .....	6,366.76
Advertising expenses (Washington office) .....	1,644.05
Furniture and equipment .....	1,041.24
Books .....	58.66
Express .....	2.00
Binding volumes .....	18.50
Travel expense .....	70.03
	<u>\$ 60,072.38</u>

## Services of Science Press

Editorial			
Salaries .....	\$ 2,592.28		
Other expenses .....	175.88		
Subscription			
Salaries .....	6,311.78		
Other expenses .....	145.08		
Advertising			
Salaries .....	2,352.41		
Other expenses .....	261.03		
Postage and supplies .....	545.32		
Rent .....	803.16		
Miscellaneous news services .....	167.75		
A. B. C. audits .....	173.67		
National Publishing Association .....	57.00	13,585.36	73,657.74
Excess of income over expenses .....			<u>\$ 422.05</u>

## Exhibit F

## AAAS-GIBSON ISLAND RESEARCH CONFERENCES

## Balance Sheet as at December 31, 1944

## Assets

Current assets			
Cash in bank .....	\$ 6,329.32		
Imprest fund .....	212.00	\$ 6,541.32	
Fixed assets			
Land .....	\$ 7,000.00		
Building .....	\$21,947.60		
Less: Reserve for depreciation .....	1,097.38	20,850.22	
Furniture and equipment .....	\$ 5,582.61		
Less: Reserve for depreciation .....	558.26	5,024.35	
Library .....	763.50	33,638.07	
Deferred charge			
Prepaid insurance .....		318.40	
		<u>\$ 40,497.79</u>	

## Liabilities

Reserved for Gibson Island maintenance and water tax .....	\$ 100.00
Operating fund .....	6,897.79
Library fund .....	500.00
Trust fund .....	33,000.00
	<u>\$ 40,497.79</u>

## Exhibit G

## AAAS-GIBSON ISLAND RESEARCH CONFERENCES

## Statement of Income and Expense for the Year Ended December 31, 1944

## Income

Registration fees .....	\$ 2,256.00	
Room rentals .....	5,939.69	
Telephone receipts .....	89.19	\$ 8,284.88

## Expenses

Secretarial assistance .....	\$ 445.20	
Postage and supplies .....	158.83	
Railroad fares .....	191.79	
Board for employees .....	385.00	
Telephone .....	194.27	
Water .....	63.54	
Electricity and gas .....	24.31	
Express and hauling .....	13.12	
Laundry .....	316.08	
Library .....	28.80	
Housecleaning .....	600.70	
Household furnishings .....	326.57	
Repairs .....	176.44	
Coal .....	26.68	
Badges .....	15.17	
Gibson Island maintenance tax .....	76.23	
Director's expense .....	392.55	
Director's honorarium .....	1,200.00	
Miscellaneous .....	102.16	
Depreciation		
Buildings .....	\$ 1,097.38	
Furniture and equipment .....	558.26	1,655.64
Provision for insurance .....	100.00	
Reserved for Gibson Island maintenance and water tax .....	100.00	6,593.08
Excess of income over expenses .....		\$ 1,691.80



# Program Ninth AAAS-Gibson Island Conference

17 June—24 August

Frontiers in Chemistry

Sumner B. Twiss, Director

## PETROLEUM CHEMISTRY

S. S. Kurtz, Jr., Chairman; P. D. Bartlett,  
Vice-Chairman

17 June E. Bright Wilson, Jr., "Infrared and Raman Spectra." R. S. Mulliken, "Ultraviolet Absorption Spectra."

18 June G. W. Wheland, "Theory of the Chemical Bond and Resonance in Hydrocarbons." P. D. Bartlett, "Report of Committee on Future Policy of Conference on Petroleum Chemistry at Gibson Island." L. S. Kassel, "Isomerization Equilibria in High Molecular Weight Paraffins." *Discussion invited.*

19 June Henry Eyring, "Theory of Viscosity of Hydrocarbons." R. W. Schiessler, "Correlation of Structure With Physical Properties of Heavy Hydrocarbons."

20 June A. Farkas, "Use of Stable Isotopic Tracer Elements in Chemical Research." G. T. Seaborg, "Use of Radioactive Tracers in Chemical Research."

21 June O. Beeck, "Recent Developments in Spectrochemical Analysis."

## CATALYSIS

H. H. Storch, Chairman; W. G. Frankenburg,  
Vice-Chairman

24 June Frederick Seitz, "Crystal Growth and Factors Influencing Catalysis." A. T. Gwathmey, "The Directional Surface Properties of Single Crystals of Metals."

25 June J. A. Becker, Informal Round Table Discussion, "Adsorption of Alkalies on Metals, Its Effect on Electron Emission, and Application to Contact Catalytic Reactions." Ahlborn Wheeler, "Determination of Pore-size Distribution in Solid Catalysts."

26 June Howard L. Ritter, "Some Experimental Methods in the Determination of Pore-size Distributions." Thomas D. DeWitt, "A Critical Review of the Present Status of Multilayer Adsorption Theory." Robert B. Anderson, "Surface Area Measurements and Chemisorption of Carbon Monoxide on Fischer-Tropsch Catalysts."

27 June L. J. E. Hofer, "The Activity of Fischer-Tropsch Iron Catalysts as a Function of the Crystal Structure and Magnetic Properties of the Unconditioned Catalysts." W. A. Horne, "Catalysts in German Synthetic Fuel Industry." B. B. Corson, "Catalytic Alkylation and Dealkylation of Aromatics."

28 June Herbert C. Brown, "A Theory of Hydrocarbon Isomerization in Homogeneous Systems."

## ORGANIC HIGH POLYMERS

C. S. Fuller, Chairman; C. C. Price, Vice-Chairman

1 July F. R. Mayo, "Copolymerization." P. D. Bartlett, "The Rate of the Steps in Vinyl Polymerization."

2 July Symposium on the Present Status of Molecular Weight Methods: F. T. Wall, "Osmotic Pressure." P. M. Doty, "Light Scattering." J. B. Nichols, "Ultracentrifuge." R. H. Ewart, "Viscosity." D. R. Morey, "Some Precipitation and Fractionation Phenomena as Related to Molecular Weights." H. M. Spurlin, "Effect of Association in Solution on Molecular Weight Results."

3 July W. H. Stockmayer, "Effects of Branching on Thermodynamic and Transport Properties of Polymer Solutions." L. R. Treloar, subject to be announced later.

4 July W. O. Baker, "Structure of Synthetic Rubber." W. B. Reynolds, "Some Observations on the Functions of Emulsifiers, Promoters and Modifiers in Emulsion Polymerization Reactions."

5 July P. J. Flory, "Physical Properties in Relation to Structure of Vulcanized Rubber."

## TEXTILES

D. H. Powers, Chairman; W. A. Sisson, Vice-Chairman

8 July Ross Whitman, "Curl in Woven Textile Fabrics: Its Cause and Control." Stanley Backer, "The Relation of Fiber and Fabric Structure to Wear Resistance and Durability."

9 July C. L. Mantell, "Some Notes on Cellulose Solvents and Their Application to Special Textile Finishes." F. T. Peirce, "Cloth Geometry and Its Application to Functional Design."

10 July H. W. Mohrman and R. J. Schatz, "The Effect of Textile Sizing Agents Upon the Physical Properties of Cotton Fabric Laminates." M. T. O'Shaughnessy and L. G. Ray, "Tensile and Torsional Properties of Textile Fibers."

11 July W. J. Hamburger, "Load-Deflection-Time Relationships in Textiles." H. Mark, "Structural Principles for Resiliency and Recovery in Fibers."

12 July S. Coppick, R. W. Little, and J. H. Church, "Chemical Behavior of Cellulose Under Influence of Retardants at Combustion Temperatures."

## CORROSION

*H. H. Uhlig, Chairman; K. G. Compton, Vice-Chairman*

15 July W. E. Campbell, "The Electrolytic Theory of Oxidation and Tarnish." J. B. Austin, "Fundamental Factors in the Oxidation of Metals and Alloys."

16 July Oscar E. Harder, "Alloy Compositions for High Temperature Applications." S. D. Heron, "Stress Corrosion of Materials Exposed to Gasoline Combustion Products."

17 July F. N. Rhines, "Internal Oxidation." Harry K. Ihrig, "Alternate Oxidation and Carburation."

18 July Marshall H. Brown, "Corrosion by Chlorine and Hydrogen Chloride at High Temperatures." Aaron Wachter, "Hydrogen Attack on Metals at High Temperatures and Pressures."

19 July G. A. Hawkins, "Corrosion by High Temperature Steam." W. O. Binder, "Recent Trends in Alloys for High Temperature Service."

## MEDICINAL CHEMISTRY

*H. A. Shonle, Chairman; E. H. Northey, Vice-Chairman*

22 July Speakers to be announced later, "Hypertension."

23 July John Lee, Glenn E. Ulliot, Edwin Fellows, Claude Winder, "Analgesics: Synthesis and Screening Tests."

24 July Speakers to be announced later, "Antibiotics."

25 July Antimalarials: Chemical Aspects. Robert C. Elderfield, "Review of the Chemistry of Recent Antimalarial Drugs Synthesized in the USA." Kenneth C. Blanchard, "Review of Foreign Progress on Antimalarials." Jackson P. English, "Metachloridine and Related Compounds."

26 July Antimalarials: Medicinal Aspects. James A. Shannon, "Clinical Evaluation." Richard S. Porter, "Screening Tests." L. H. Schmidt, "Pharmacology."

## VITAMINS

*N. B. Guarrant, Chairman; D. W. Woolley, Vice-Chairman*

29 July F. P. Zscheile, "Recent Developments in Carotene Research." G. W. Kidder, "Growth Factors Required by Protozoa." C. I. Bliss, "The Design and Analysis of Experiments for Measuring Vitamin Potency."

30 July E. L. R. Stokstad and B. L. Hutchings, "Chemistry and Biological Function of Folic Acid." Paul Day, "Studies on the Nutrition of the Monkey,

With Special Reference to the *Lactobacillus casei* Factor (Factor M, Factor Be)." William J. Darby, "The Response of Sprue and Pernicious Anemia to the Administration of Synthetic *L. casei* Factor (Vitamin M, Folic Acid)."

31 July B. Connor Johnson, "The Metabolites of Nicotinic Acid and Nicotinamide in Human and Swine Nutrition." W. A. Krehl and C. A. Elvehjem, "Nicotinic and Tryptophane Relationship."

1 August J. A. Reyniers, "Germ-free Life as Applied to Nutrition Studies." L. B. Pett, "Some Public Health Aspects of Malnutrition." D. W. Woolley, "Vitamin Antagonists."

2 August Ancel Keys and Olaf Michelson, "The Relation in Man Between Intake and Urinary Excretion of Thiamine and Riboflavin as Affected by Activity."

## FOOD AND NUTRITION

*H. J. Almquist, Chairman; Lawrence Atkin, Vice-Chairman*

5 August David M. Greenberg, "The Dynamics of Calcium and Phosphorous Metabolism." Philip L. Harris, "Some New Tocopherol Effects in Nutrition."

6 August F. J. Stare, title to be announced later. Daniel Melnick, "Physiological Availability of the Vitamins."

7 August H. E. Longenecker, "Nutritional Value of the Fatty Acids." Elsie Dawson, "Taste Panels."

8 August H. L. Fevold, "Food and Feed Value of Yeast." Bacon F. Chow, "Biochemical Studies on Protein Hydrolysates."

9 August L. C. Norris, "The Role of Folic Acid and Related Substances in Nutrition."

## CANCER

*H. P. Rusch, Chairman; A. M. Brues, Vice-Chairman*

12 August J. A. Miller and E. C. Miller, "The Metabolism and Carcinogenicity of p-Dimethylaminoazobenzene and Its Derivatives in the Rat." L. O. Jacobson, C. L. Spurr, G. F. Dick, and E. S. Guzman Barron, "Chemotherapeutic Studies in Lymphoma."

13 August Jack Schultz, "Nuclear Differentiation and the Origin of Tumors." C. Carruthers, "Some Chemical Changes Induced by Methylcholanthrene in the Transformation of Mouse Epidermis to Squamous Cell Carcinoma."

14 August W. C. Hueper, "The Significance of Industrial Tumors in Cancer Research." A. M. Brues, "Carcinogenic Effects of Some Radioactive Compounds That May Be a Problem in Certain Future Industries." P. S. Henshaw, "Carcinogenic Effect of Pile Radiations in Rats and Mice."

15 August S. Spiegelman, "The Synthesis and



March 1, 1946

Maintenance of Intracellular Enzymes." L. C. Strong, "The Induction of Germinal Mutations by a Carcinogenic Chemical." W. E. Heston, "Paths of Gene Action in Mammary Tumor Development in Mice."

16 August W. U. Gardner, "Steroid Hormones in the Induction of Cancer."

## INSTRUMENTATION

R. D. Webb, Chairman; C. O. Fairchild, Vice-Chairman

19 August A. Keith Brewer, "The Mass Spectrometer: Its Principle of Operation and Its Application to Practical Analytical Problems." H. L. Andrews, R. C. Machler, and A. J. Williams, Jr., "Recording Methods in Spectrochemical Analysis."

20 August Gordon Brown, C. E. Mason, A. C. Hall, A. F. Sperry, and G. A. Philbrick, "Theories of Automatic Control."

21 August Gordon B. Sayre, "Applications of Modern Plastics in Instruments." V. Lawrence Paragian, "A New Galvanometer." W. F. Swann, "New Photographic Materials and Methods."

22 August Charles F. Kettering, subject to be announced later. John J. Grebe, "Application of Control Principles to Human Endeavor."

23 August R. B. Sosman, "Pyrometric Control of the Open-hearth Furnace."

## HISTORY

The Gibson Island Research Conferences were inaugurated on a substantial, continuous basis in 1938 by Dr. Neil E. Gordon. They have been sponsored by the American Association for the Advancement of Science since this time. Gifts by industrial companies whose laboratories have been represented at the Conferences have enabled the AAAS to purchase the Conference property. This property consists of a large residence and auxiliary building located on a wooded 3.6-acre lot on the highest hill on the Island. The property provides accommodations for about 56 persons in addition to the Conference room and library. All meals are taken at the Gibson Island Clubhouse.

## LOCATION

Gibson Island is situated in Chesapeake Bay, about 23 miles south of Baltimore. It is approximately 1,000 acres in area, and is connected with the mainland by a causeway. Transportation to and from Baltimore is afforded by the Lakeshore Bus Company, which operates on a limited schedule. The Island offers opportunity for many sports: golf, tennis, both salt- and fresh-water bathing, fishing, and sailboating.

## PURPOSE

The purpose of the Gibson Island Conferences is to stimulate research endeavor in universities, research foundations, and industrial laboratories. This purpose is achieved by an informal type of meeting consisting of scheduled lectures and discussion of topics of current research interest.

The first meeting of the week is held Monday morning at 10 o'clock. Other morning sessions through Friday usually last from 9:30 to 12:00. The second session of the day is generally held in the evening from 7:30 to 10:00, Monday through Thursday. There are no Friday evening sessions, and Conference members are expected to check out Friday afternoon.

## ATTENDANCE

Those interested in attending are instructed to send in their applications to the Director, on or before March 15. Each applicant must state the institution with which he is connected, and the type of work in which he is most interested.

The Director will submit the names of those requesting attendance to the chairman of the respective Conferences. The chairmen, in conjunction with a program committee, will go over the names and select the members in an effort to distribute the requests as fairly as possible among the various institutions represented. Names selected by the program committee will be returned by the chairmen to the Director, who will notify the selectees; at that time, each one who is to attend will be requested to register by mail. On receipt of the registration fee of \$3.00, made payable to the American Association for the Advancement of Science, a registration card will be sent, giving admission to the Island and use of all guest privileges, including a room reservation. Rooms are \$3.00 or \$3.50 per day per person, and board is a la carte. On proof that the member is paying his own personal expenses, he may be granted a reduction of \$1.00 per night on his room rent. This information should be given at the time the person makes a request for attendance. All registration fees will be returned and room reservations canceled, providing notice of inability to attend is received at least 15 days before the Conference.

Accommodations may be available for a limited number of women who wish to accompany their husbands. All such requests should be made at the time of the request for attendance, for these particular limited accommodations will be assigned in the order received.

All requests for attendance, or any additional information, should be addressed to Dr. Sumner B. Twiss, Chemistry Department, Wayne University, Detroit 1, Michigan.

## Meeting Notes

### General Sessions

At each annual meeting of the American Association for the Advancement of Science several "General Sessions" are held, the first of which is devoted largely to the address of the retiring president. At the St. Louis meeting on Wednesday evening, 27 March, Dr. Anton J. Carlson, emeritus professor of physiology at the University of Chicago and president of the Association in 1944, will deliver his retiring address on "Be There 'a Standard to Which the Wise and the Honest Can Repair'?"

Dr. Carlson's address, which will be delivered in the Opera House of the magnificent Kiel Auditorium, will be followed by a reception to members of the Association by leading citizens of St. Louis. It is expected that among the distinguished scientists present at this session will be Dr. Arthur H. Compton, formerly professor in the University of Chicago, now president of Washington University, and president of the Association in 1942; Dr. Charles F. Kettering, director of General Motors Research Laboratories and president of the Association in 1945; and Dr. James B. Conant, president of Harvard University and president of the Association during 1946. Rarely, if ever, in the 98 years since the Association was founded have four of its presidents and past presidents participated in one of its general sessions.

At the second general session, which will be held on Thursday evening, 28 March, in the Gold Room of the Jefferson Hotel, Dr. E. C. Stakman, of the University of Minnesota, will deliver the twenty-second lecture under the joint auspices of the Association and the Society of the Sigma Xi. On the following evening Dr. Irwin Edman, professor of philosophy in Columbia University, will deliver the eighth annual lecture under the joint auspices of the Association and the United Chapters of Phi Beta Kappa in the Gold Room of the Jefferson Hotel. The title of Dr. Edman's address will be "Science and the Dream of Happiness." On Friday evening, in the Kiel Auditorium, the National Geographical Society will present Mr. Luis Marden in a lecture on "Seeing Costa Rica," which will be illustrated by colored motion pictures.

### Hotel Headquarters

*Jefferson Hotel:* General Headquarters.

Headquarters of the sections of the Association and of the societies meeting with the Association in St. Louis are as follows:

*Claridge Hotel:* Sections on Astronomy, Chemistry, Geology and Geography, Physics, and Mathematics; American Association of Geographers, American As-

sociation of Scientific Workers, American Institute of Mining and Metallurgical Engineers, American Meteorological Society, Geological Society of America, Institute of Mathematical Statistics, Mathematical Association of America.

*Coronado Hotel:* Section on Medical Sciences, Alpha Epsilon Delta.

*DeSoto Hotel:* Section on Agriculture; American Nature Study Society, American Society for Horticultural Science, Beta Beta Beta, Central Association of Science and Mathematics Teachers, Cooperative Committee on Science Teaching of the AAAS, National Association of Biology Teachers, National Council of Teachers of Mathematics, National Science Teachers Association, Union of American Biological Societies.

*Jefferson Hotel:* Section on Zoological Sciences, American Association of Economic Entomologists, American Microscopical Society, American Society of Naturalists, American Society of Parasitologists, American Society of Zoologists, Conference on Methodology of Science, Conservation Council, Ecological Society of America, Entomological Society of America, Gamma Alpha Graduate Scientific Fraternity, Limnological Society of America, National Association of Scientific Writers, Phi Beta Kappa, Sigma Xi, Society for the Study of Speciation.

*Lennox Hotel:* Genetics Society of America, Phi Sigma Society, Potato Association of America, Sullivant Moss Society.

*Mark Twain Hotel:* Sections on Education, Historical and Philological Sciences, Psychology, and Social and Economic Sciences; American Statistical Association, Midwestern Psychological Association, Phi Gamma Mu, Society for Research in Child Development.

*Statler Hotel:* Section on Botanical Sciences, American Fern Society, American Phytopathological Society, American Society of Plant Physiologists, American Society of Plant Taxonomists, Botanical Society of America, Mycological Society of America, Sigma Delta Epsilon.

### Registration

All members of the AAAS are expected and urged to register. The registration fee is \$1.00. The names and local addresses of persons registering will be listed in the Visible Directory located at the registration center. In addition to the *General program* listing papers and activities of all sections and of all societies meeting with the Association, registrants will receive a Convention Badge, since admittance to certain sessions and functions may be contingent upon display of this identification.



The main registration desks are to be located at the center of the exposition hall of the Municipal Auditorium. Street-level entrances on 14th and 15th Streets provide ready access to the main corridors between the exhibit booths leading to the registration center, which will be open at 8:00 A.M. each day. Supplemental registration desks will be open from 8:00 to 11:00 A.M. on Wednesday in the Coronado and Jefferson Hotels, on Thursday morning in the Statler Hotel, and on Thursday and Friday mornings in the DeSoto Hotel.

Persons desiring extra copies of the *General program* may secure them during the meeting for \$1.00 each, or at a reduced rate by writing to the Permanent Secretary at the close of the meeting, if extra copies are then available.

### Meetings of Sections and Societies

(A) *Mathematics*. The Section on Mathematics has planned three sessions, starting Friday, 29 March, at 2:30 P.M. in Room 4D of the Auditorium. The feature of the opening session will be the address of the retiring chairman, J. L. Walsh, of Harvard University, on "Taylor's Series and Approximation to Analytic Functions." Teaching problems will be emphasized in a joint session with the Missouri Section of the Mathematical Association of America on Saturday morning, and, following a luncheon for mathematicians and guests on the 15th floor of the DeSoto Hotel, an afternoon session with the Institute of Mathematical Statistics will consider applications of statistical techniques to engineering, business, and population.

(B) *Physics*. The Section on Physics has scheduled a single session, which will be held in Room 4C of the Auditorium on Friday, 29 March. The program will be of general interest to scientists attending the St. Louis meetings because it includes a talk by Rear Admiral H. G. Bowen on "Research Projects of the Office of Research and Inventions," as well as papers by F. O. Schmitt and M. D. Kamen on specific applications of physics to biological research. Another feature of the program is the retiring vice-presidential address on "Whither Physics?" by R. C. Gibbs, of Cornell University.

The *American Meteorological Society* has also planned two sessions and a luncheon for Friday, 29 March. Featured in the morning session are papers dealing with the relationship between storms and seismic records. Some applications of radar to meteorology will be considered in the afternoon meeting. Both sessions will be held in Committee Room A in the Auditorium.

(C) *Chemistry*. The Section on Chemistry has arranged a symposium on Chemotherapy which will extend through four sessions, starting Thursday morning and continuing until Friday afternoon. Arthur J. Hill will serve as chairman at the Thursday sessions, when R. B. Woodward, Selman A. Waksman, Walter Seegers, and K. P. Link will speak. On Friday contributors to the symposium include E. A. Evans, W. Price, M. Slein, S. P. Colwick, C. F. Cori, O. H. Gaebler, and R. J. Williams. For these sessions Henry Eyring will occupy the chair. A business meeting and dinner, scheduled for Thursday evening, with E. A. Doisy as honorary chairman, will be followed by the address of the retiring vice-president and chairman of the Section, Arthur J. Hill. Reservations must be made through Dr. N. E. Gordon, Wayne University, Detroit 1, Michigan, by 13 March. The business meeting and dinner will be held at the Hotel Jefferson; the regular sessions will take place in Assembly Room 4, Kiel Auditorium.

(D) *Astronomy*. The Section on Astronomy has planned sessions for the forenoon and afternoon of Friday, 29 March, and for the forenoon of Saturday, 30 March, with a Section luncheon at 1:00 P.M. Saturday. The headquarters hotel for the Section is the Claridge, and the meetings will be held in one of the session rooms of the Kiel Auditorium starting at 9:30 Friday morning. Two retiring vice-presidential addresses are scheduled for Friday afternoon. The first is by Robert R. McMath, of the McMath-Hulbert Observatory of the University of Michigan, on three-dimensional work on solar prominences. The second is by Seth B. Nicholson, of the Mt. Wilson Observatory, on "The Solar Cycle." J. J. Nassau, Section chairman, will deliver a paper on "Problems Relating to Objective Prism Spectra." W. W. Salisbury, director of research of the Collins Radio Corporation, will deliver a paper on "Possibilities in the Astronomical Use of Radar." Several other papers have been promised on subjects varying from photometric work and celestial navigation to comet orbits and the secular perturbations of Mercury.

(E) *Geology and Geography*. Section E will meet jointly with the Geological Society of America, Association of American Geographers, and Industrial Minerals Division of American Institute of Mining and Metallurgical Engineers for seven sessions on Wednesday, Thursday, and Friday, 27-29 March, in Committee Rooms B, B-1, B-2, and A of the Kiel Auditorium. Carl Tolman is chairman of the local committee.

On Wednesday, 27 March, a symposium of ten papers on Pennsylvanian problems, organized by H. R. Wanless, will occupy two sessions: Part I, Strati-

graphic, meeting in Committee Room B at 9:00 A.M.; and Part II, Paleontologic, meeting in Committee Room A at 2:00 P.M. A session with seven papers on Industrial Minerals, organized by R. M. Foose, of the Industrial Minerals Division, A.I.M.E., will convene at 9:00 A.M. in Committee Room B, on Thursday, 28 March. The address of the retiring vice-president and chairman, Howard A. Meyerhoff, on "Geomorphology, the Inexact Science," will be delivered at 2:00 P.M. Thursday, 28 March, in Committee Room B. It will be followed by six papers on geomorphology, climatology, and geography, and will include a series of papers on geomorphic evolution of the Appalachian region. A symposium of eight papers on Pleistocene geology of the North Central states, convening at 9:00 A.M. Friday, 29 March, in Committee Room B-1, has been organized by Leland Horberg. Concurrently, a session devoted to General Geology will meet in Committee Room B-2. A session on Missouri geology, meeting in Committee Room B, has been organized by E. L. Clark for Friday at 2:00 P.M.

*Section E meets with Section K* for a joint session Wednesday afternoon (see program of Section K). On Thursday morning Section E also meets jointly with Sections O and K (see Section O program).

*For Saturday, 30 March, informal field trips* may be arranged through the local committee for those interested. The suggestions which have been made include inspection of the Paleozoic stratigraphic section near St. Louis, local glacial features, Saint Louis University Seismograph Station and Geophysical Institute, and features of interest on the Washington University campus.

(F) *Zoology.* The interests and activities of the Section on Zoology are closely identified with those of the American Society of Zoologists. The latter organization will hold its annual meeting at the Hotel Jefferson and at Washington University on 28, 29, and 30 March. In addition to a promising program of technical sessions, there will be several feature events. One is a symposium on "Dynamics of Production in Aquatic Populations," organized by A. S. Pearse and sponsored jointly by the Ecological Society of America and the Limnological Society of America. The session, including papers by Thomas Park, G. L. Clarke, R. W. Pennak, W. T. Edmondson, and W. E. Ricker, is scheduled for 2:00 P.M. Thursday in the Gold Room of the Hotel Jefferson. At the same time, in the Ivory Room, E. B. Babcock will address a joint session of the Society and Section G on "Crepis and Evolution." In conjunction with the Botanical Society of America, the Genetics Society of America, and the American Society of

Naturalists, a symposium on "Recent Advances in the Dynamics of Behavior," organized by K. S. Lashley, will be held in the Ivory Room at 2:00 P.M. Saturday.

*The American Society of Zoologists* will join the American Society of Naturalists and other biological groups in sponsoring the Biologists' Smoker to be held on Thursday, 28 March, at 9:00 P.M. in the Kie Auditorium. Admission will be by AAAS registration badge.

*The annual dinner of the American Society of Zoologists*, to which all zoologists and friends are invited, will be held at 6:30 Friday evening, 29 March, in the Crystal Room of the Hotel Jefferson. Dr. Carl G. Hartman, vice-president and chairman of Section F, will deliver the annual address on "The Little Researcher."

*The North Central States Entomologists Branch* of the American Association of Economic Entomologists will meet at the Jefferson, starting at 1:30 P.M. 27 March. Thursday morning, in a joint meeting with the Entomological Society of America, Clyde Kearns will tell of the insect control work of the Office of Scientific Research and Development, and a discussion of the place of entomology in the National Science Foundation will follow. This meeting, as well as the general session scheduled for Friday morning, is followed by an afternoon of sectional meetings and conferences.

*The Entomological Society of America* is planning three days of meetings, starting at 10:00 A.M. Wednesday, 27 March. Headquarters and meetings will be in the Hotel Jefferson. In the Society's several sessions 24 technical papers will be presented, and on Thursday afternoon, after a short technical program, the Society will hold its annual business meeting. A meeting of the Executive Committee will be held Wednesday at 8:00 P.M. in Private Dining Room No. 5. Special features include the joint session with the North Central States Entomological Branch of the American Association of Economic Entomologists at 9:30 A.M. Thursday in the Crystal Room; the entomologists' banquet at 7:00 P.M. Thursday in the same room, to be followed by the address of the president of the Entomological Society of America, James A. G. Rehn; and a joint session with the Ecological Society of America at 9:30 A.M. Friday.

*The American Society of Parasitologists* will hold its twentieth annual meeting at St. Louis from 28 to 30 March, inclusive. Headquarters for the Society will be in the Hotel Jefferson, and except for the demonstrations, the technical sessions, involving the presentation of 69 papers, will take place in Private Dining Room No. 9 in this hotel. Special features



make the presidential address of Asa C. Chandler "The Making of a Parasitologist," to be given at 10:00 A.M., 29 March. The address will be followed at 12:30 P.M. by the Parasitologists' luncheon, and a business meeting at 1:30 P.M. will precede the afternoon demonstration program.

(G) *Botany*. The several botanical and biological societies have arranged a crowded schedule of activities in which the Section on Botany, as such, will play a small, though important part. The Section will sponsor a joint session on Thursday at 2:00 P.M. in the Ball Room of the Hotel DeSoto, and other joint meetings involving two or more societies are features of the botanical sessions.

The *Botanical Society of America* will hold its fortieth annual meeting from 28 to 30 March, inclusive. The Statler Hotel will be official headquarters. The sessions of the several sections of the Society will begin Thursday morning and will run through Saturday afternoon.

The all-botanists' dinner is scheduled to take place Thursday at 6:00 P.M. in the Statler. In addition to the joint meeting with Section G on Thursday afternoon, there will be other joint meetings with the American Society of Plant Physiologists, the Mycological Society of America, the American Society of Plant Taxonomists, the Ecological Society of America, and the American Society for Horticultural Science. Special symposia on photosynthesis, radioactive substances, mineral nutrition, paleobotany, and systematic botany are being arranged for the joint sessions, while the programs of the other sections will consist in large part of contributed papers of a technical character. A new section of the Society, the Microbiological Section, has been authorized by the Council and will hold its first meeting at St. Louis.

The *American Phytopathological Society* will meet on 27 to 30 March, inclusive, with headquarters and meetings at the Hotel Jefferson. The annual dinner of the Society is scheduled for Thursday evening. In addition to the joint session with Section G on Thursday afternoon, there will be joint meetings with the Potato Association of America on Friday morning and with the Mycological Society of America on Saturday morning. Ninety technical papers will be presented in the meetings of the Section on Fungicides, Viruses, Factors Affecting Disease Development, Forest Pathology, Genetics, Physiology of Pathogenic Fungi, Cereal Diseases, and Vegetable Diseases.

The interests of the *American Society of Plant Physiologists* and the Physiology Section of the *Botanical Society of America* are so closely identified that joint sessions of the two groups have been

scheduled for Thursday, Friday, and Saturday in parlors 102, 104, and 106 in the Statler. In addition to the joint session with Section G on Thursday afternoon, there will also be a joint session with the Section on Agriculture and the American Society for Horticultural Science on Friday, to consider "Mineral Nutrition of Plants and Animals." A dinner has been arranged for the physiologists on Friday evening at the Statler.

The *Mycological Society of America* will begin its sessions on Thursday at 9:00 A.M. in Room 4C of the Auditorium. A program of technical papers will follow the business meeting, and other technical sessions are scheduled in the same room for Friday morning and afternoon. On Thursday afternoon, in the joint session with Section G and the other botanical organizations, the address of the retiring president of the Society, Frank Kern, of Pennsylvania State College, will be given on the subject, "Some Bases for Mycological Progress." On Saturday morning there will be a joint session with the American Phytopathological Society and the Botanical Society of America. Thursday evening, following the dinners of the phytopathologists and botanists, there will be a joint meeting in Room 3A of the Auditorium to consider the formation of a general organization of biologists.

On Friday at 6:00 P.M., a dinner will be given by *Anheuser-Busch, Inc.*, at the company's brewery. The dinner will be followed by a program of papers dealing with the scientific and practical aspects of yeast, to be led by Carl C. Lindegren at Washington University.

The *Sullivant Moss Society* will open its sessions with a breakfast on Friday morning, to be followed by a program of general papers and in the afternoon, by a symposium on the phytogeography of mosses, sphagna, hepatics, and lichens. On Saturday a field trip has been arranged for the members of the Society, who will journey to St. Genevieve County, about 80 miles south of St. Louis.

The *American Society of Plant Taxonomists* has arranged two joint sessions with the Systematic Section of the Botanical Society of America. These meetings will be held on Thursday and Friday mornings, and on Friday evening at 6:00 there will be a dinner of the Society, followed by an address by Francis W. Pennell.

(F-G) *Zoological and Botanical Sciences*. The program of the American Society of Naturalists starts on Thursday at 4:00 P.M. with a meeting of the Executive Committee at the Hotel DeSoto. The Society will meet with the Union of American Bio-

logical Societies at 8:00 P.M. Thursday evening in the Auditorium to consider plans for a Biological Institute, and this meeting will be followed by the Biologists' Smoker in the session rooms on either side of the Grand Lounge. A business meeting will occupy Saturday morning, and at 2:00 P.M., in the Ivory Room of the Hotel Jefferson, a joint session with the American Society of Zoologists, the Botanical Society of America, and the Genetics Society of America, on "Recent Advances in the Dynamics of Behavior," will be concluded by the presidential address of Edmund W. Sinnott on the subject, "Substance or System, the Riddle of Morphogenesis."

*The Ecological Society of America* will hold its thirtieth annual meeting from 28 to 30 March. In addition to technical sessions for the discussion of research on plant and animal ecology, the Society will join the American Society of Zoologists and the Limnological Society of America in a symposium on aquatic populations, scheduled for 2:00 P.M. Thursday in the Gold Room of the Hotel Jefferson. There will be a joint session with the Entomological Society of America at 9:30 A.M. Friday in the Crystal Room of the Jefferson, joint sessions with the Botanical Society of America at 9:30 A.M. and 2:00 P.M. on Saturday, a conference on the teaching of ecology at 9:30 A.M. on Friday, and a special program on applied ecology at 2:00 P.M. on Friday. The ecologists' dinner is scheduled for 7:00 P.M. Friday, and following the dinner, Robert F. Griggs, past president of the Society, will give an illustrated address on "Timberlines of North America and Their Significance." Saturday afternoon an excursion to the St. Louis Zoo has been planned.

*The program of the Genetics Society of America* will start with a demonstration program on Thursday morning at Washington University. In addition to technical sessions scheduled for Thursday and Friday afternoons at the Hotel Lennox, there will be a joint session with the Biometrics Section of the American Statistical Association on Friday morning, to consider "The Statistical Analysis of Hybrid Vigor." Invitational papers by Drs. Mirsky, Pollister, Ris, Stern, Lindegren, Muller, Russell, and Douglass will be presented on Saturday morning, and on Saturday afternoon the Society will join the American Society of Naturalists in a joint session on "The Neurodynamics of Behavior." The annual luncheon and business meeting of the Society will be held Friday noon.

*For the American Microscopical Society* the program at St. Louis will constitute the sixty-second annual meeting. The Society program includes an Executive Committee luncheon on 28 March at 12:30

and the annual business meeting at 4:00 P.M. Friday. Headquarters and meetings will be in the Hotel Jefferson.

*The Limnological Society of America* will hold its annual meeting on Thursday and Friday, 28 and 29 March, with headquarters and session meetings in the Hotel Jefferson. On Thursday afternoon the Society will join with the American Society of Zoologists, the Ecological Society of America in the presentation of a symposium entitled "Dynamics of Production in Aquatic Populations." The morning and afternoon sessions on Friday will be devoted to technical papers on limnology and closely allied subjects. The annual business meeting will conclude the Friday afternoon sessions.

*The National Association of Biology Teachers* will meet on 29 and 30 March. Headquarters will be established in the Hotel DeSoto, and on Friday business sessions will be held in Parlor D in this hotel. Following an address of welcome by Prevost Whitaker, president of the Association, at 10:00 A.M. in the Ball Room of the DeSoto, the regular Saturday sessions will be devoted to aspects of conservation. An address by Otis W. Caldwell on "Of What Does Good Biology Teaching Consist?" will conclude dinner at 6:30.

*The Union of American Biological Societies* has scheduled a joint meeting of the biological organizations participating in the St. Louis convention to consider plans for a Biological Institute. This meeting will be held at 8:00 P.M. Thursday in the Auditorium immediately preceding the Biologists' Smoker.

*On 29 March the American Nature Study Society* will hold its forty-first annual meeting. The Society's program, which is scheduled to start at 2:00 P.M. in the Hotel DeSoto, features a series of papers on "Conservation Education," to be followed by a general discussion under the chairmanship of E. C. Palmer, of Cornell University. The annual business meeting of the Society will be held at 8:00 P.M. in the Jefferson National Expansion Museum, with President Charles E. Mohr presiding. This meeting will be concluded with a showing of nature pictures.

*Beta Beta Beta* will meet in Parlor D of the Lennox Hotel Thursday afternoon, 28 March. There will be a luncheon at 12:30, followed by a memorial program for the late President C. E. McClung. The biennial business meeting and election of officers will conclude the session.

*Phi Sigma Society* will limit its activities to the meeting of the National Council. Starting at 8:00 P.M. Wednesday, the Council meetings will continue through Saturday morning in Parlor A at the Hotel DeSoto.



(I) *Psychology.* The Section on Psychology and the Midwestern Psychological Association will meet on 28, 29, and 30 March. The meetings will be held in Rooms 3C and 3D of the Auditorium and will include 43 technical papers. On Thursday afternoon, in a joint session with Section Q (Education), W. L. Pressey, of Ohio State University, will deliver his address as retiring president of the Midwestern Psychological Association on the subject "Acculturation: Disgrace or Challenge." Florence Goodenough, of the University of Minnesota, will present her address as retiring vice-president of the Section on Psychology on the subject, "Semantic Choice and Personality Structure." The address of H. H. Remmers, of Purdue University, retiring vice-president of the Section on Education, on the subject, "You Can Change Human Nature," concludes the session. Of the technical sessions the two scheduled for Thursday morning will be concerned, respectively, with "Learning" and "Clinical and Abnormal Psychology." On Friday the morning program will be concerned chiefly with "Animal Psychology and Perception"; the afternoon program, with "Social Psychology." The Section and its affiliate will conclude their meetings with two sessions Saturday morning, dealing, respectively, with "Physiological Psychology" and "Psychological Tests."

Running concurrently with the Friday program of Section I and the Midwestern Psychological Association will be morning and afternoon sessions of the Society for Research in Child Development. Papers by L. W. Sontag, H. E. Jones, H. H. Anderson, R. J. Havighurst, Robert R. Sears, John E. Anderson, and others are scheduled for presentation in these sessions.

(K) *Social and Economic Sciences.* The Impact of Technology on Society will be the theme of six sessions sponsored by Section K. The meetings will begin on 27 March at 2:30 P.M. with a session in cooperation with Section E on "The Impact of Technology in Relation to Planning." Thursday morning program on "Technology and Economic Organization" has been arranged in conjunction with the National Planning Association. The afternoon session, which was arranged by the Academy of World Economics, will consider "Technology and International Relations." Friday morning, in collaboration with the Department of Rural Sociology at the University of Missouri, Section K will give special attention to regional study, with emphasis upon the Missouri Valley problem. The Pi Gamma Mu luncheon will follow this session, and it will feature the address of S. Howard Patterson, who retires as chairman of Section K and vice-president of the Association, as well as an address on "Science and Religion" by Edwin

McNeill Poteat, president of the Rochester-Colgate Divinity School. The series will end Saturday morning with a session on "Human Conservation." Among the speakers in the several sessions are S. Colum Gillfillan, of the University of Chicago; Paul Greer, farm editor of the *St. Louis Post-Dispatch*; Harold Urey, of the University of Chicago; and F. B. Heinkel, president of the Missouri Farmers Association. The Academy of World Economics and the Pi Gamma Mu Society have cooperated in the preparation of the program, and the American Library Association has arranged a book exhibit on Science and Society.

*The American Statistical Association*, an affiliate of Section K, has arranged three symposia. The first, under the chairmanship of Fred J. Halton, Jr., of Deere and Company, is scheduled for 2:30 P.M., 27 March, and will deal with "Quality Control in American Industry." At 10:00 A.M. on Thursday, "Social Sampling and the Measurement of Opinion" will be the subject, with W. F. Ogburn, of the University of Chicago, in the chair. Participants in this program will include Samuel A. Stouffer, of the Social Science Research Council; George A. Gallup, of the American Institute of Public Opinion; and Philip M. Hauser, of the Department of Commerce. In the afternoon consideration will be given to "Personnel Selection by Psychological Tests," under the chairmanship of Capt. John G. Jenkins, of the Bureau of Medicine and Surgery, Navy Department. In addition to the three general sessions, the Biometrics Section of the Association will hold technical sessions dealing with the applications of statistical methods in biological work.

(M) *Engineering.* The Section on Engineering has planned no separate sessions for the St. Louis meeting, but the Industrial Minerals Division of the American Institute of Mining and Metallurgical Engineers has arranged a joint session with Section E on Thursday, 28 March, at 9:00 A.M. in Committee Room B of the Kiel Auditorium. Industrial minerals and rock products in the Central states will receive special consideration.

(N) *Medical Sciences.* The Section on Medical Sciences, in cooperation with the Council on Industrial Health of the American Medical Association, has organized a symposium on "Medical Science and Industry." One of the outstanding developments of the war has been an appreciation of the expanding concept of the field of industrial health, encompassing both the physical well-being and the mental outlook of the worker. The use of raw materials and intermediates which have heretofore been laboratory curiosities or little more than formulae on paper has exposed war workers to physical and chemical agents

of unknown action. Despite precautions, scientists could not always predict the lethal action of their creations; and prompt rehabilitation of injured workers was essential to vital production. Mental adjustments to the speed-up of the emergency worked untold psychic upsets and created new mental problems. In four sessions, scheduled for the mornings and afternoons of 27 and 28 March, the Section will review these war problems and the contributions of medical science to their solution, in the belief that such a view will aid in the development of a positive health program in industry during the postwar period. A total of 19 papers will be presented by outstanding investigators on the general topics of atomic energy, trauma, occupational restoration and positive health in employment procedures, and industrial medicine as a special discipline and industrial toxicology. The address of the retiring vice-president, Warfield T. Longcope, entitled "The Importance of Researches Upon War Gases to Clinical Medicine," will bring the symposium to a close. All sessions will be held in Room 1807 of the auditorium of the Washington University School of Medicine, 4580 Scott Avenue.

*Alpha Epsilon Delta*, national honorary premedical fraternity, in conjunction with Section N (medical sciences), is arranging a special program on premedical advisory problems for the AAAS meeting in St. Louis. The symposium will be held in the Coronado Hotel at 1:30 P.M., Friday, 29 March.

Dr. Carlyle F. Jacobsen, Assistant Dean, Washington University School of Medicine, St. Louis, will present a thorough discussion of the use and measurement value of the various *objective* methods of investigating the educational background of the student. This will be followed by a discussion by Dr. George T. Harding, School of Medicine, The Ohio State University, Columbus, of the personality traits to be found and recognized in recommending students for the study of medicine. The second half of the program will deal with the length and content of the premedical curriculum. Dean Stanley Dorst, School of Medicine, University of Cincinnati, will present the point of view of the medical school and Dr. William H. Cole, Rutgers University, New Brunswick, New Jersey, that of the liberal arts college.

The discussion will be directed to answering questions directly related to the problems concerned with the preparation of students for the study of medicine and the selection of candidates for recommendation and admission. All interested medical and premedical educators and students are invited to attend and participate in the symposium.

(O) *Agriculture*. The Section on Agriculture has planned a symposium jointly with the Section on Geol-

ogy and Geography and the Section on Social and Economic Sciences for Thursday at 9:00 A.M. in Room 3A of the Auditorium. The symposium will give consideration to modern concepts of soils, factors causing divergence in soil properties during soil formation, the relation of soils to plant growth, and the relation of soils to the distribution of human populations. At 2:00 P.M. Friday, on the 15th floor of the DeSoto Hotel, the Section will join with the American Society for Horticultural Science, the American Society of Plant Physiologists, and the Physiologic Section of the Botanical Society of America for a program of papers dealing with "Soils in Relation to the Nutrition of Plants, Animals, and Man." Attention will be focused on cellular and tissue metabolism, nutritional deficiencies of farm animals as related to soil and crop composition, nutritional diseases of man in relation to geographic areas, and the importance of soil fertility in human welfare. The last subject will be the theme of the address of the retiring vice-president and chairman of Section O, William A. Albrecht, whose paper will conclude the program.

The *Potato Association of America* will meet jointly with the American Society for Horticultural Science on Thursday and with the American Phytopathological Society on Friday.

The *American Society for Horticultural Science* will begin its activities on Thursday morning with two sessions—one of them the joint meeting with the Potato Association of America, and the other, a general session on pomology. Thursday afternoon a general session on chemical weed control will be followed by a joint session with the Biometrical Section of the American Statistical Association. Thursday evening has been set aside for round-table discussions on Plant Genetic Stocks. Simultaneous sessions on pomology, vegetables, and floriculture and ornamental horticulture will occupy Friday morning and Friday afternoon has been set aside for the joint symposium on "Mineral Nutrition of Plants and Animals." The annual banquet of the Society is scheduled for 6:30 P.M. Friday, when W. B. Mack of Pennsylvania State College, will deliver his retiring presidential address. At 9:30 there will be a round-table panel discussion on Teaching Methods. Saturday morning the schedule calls for simultaneous sessions on vegetables, pomology (propagation), and fruit storage and processing. The meetings of the Society will be concluded Saturday afternoon with a general business session, followed by two technical sessions on nuts and small fruits.

(Q) *Education*. Five sessions of Section Q are planned, beginning at 9:30 Wednesday morning, 27



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the School Curriculum." Starting with a joint session at which A. J. Carlson will be the main speaker, the meeting will be continued in group sessions, one for each of the cooperating societies. The afternoon session will be conducted in the same manner, with Ira Gabrielson as the principal speaker at the joint session. The Association will join with the National Association of Biology Teachers for dinner Saturday evening and for the address by Otis W. Caldwell. The Board of Directors of the National Science Teachers Association is scheduled to meet on Sunday after the regular sessions have been concluded.

#### Additional Notes

*Other Societies and Sections* have indicated their intention to hold sessions at St. Louis, but they have not submitted statements of plans as this issue of *Science* goes to press.

*Last-minute corrections and additions to the program* will be announced in *Science*. In order to expedite this late news the secretaries or others responsible for the arrangements should forward the original of an announcement to Dr. Howard A. Meyerhoff, Smithsonian Institution Building, Washington 25, D. C., and a carbon copy to the Editor of *Science*, Massachusetts and Nebraska Avenues, Washington 16, D. C.

*The Meeting 27-30 March 1946 is the fifth St. Louis meeting.* The Association first met in St. Louis in 1878, when 134 members were registered and 103 papers read. The total membership of the Association was 558 at that time.

*Scientists of the St. Louis area were hosts to AAAS* in 1903 and 1919 for the second and third times.

*Saint Louis University began its work in 1818*, three years before Missouri was admitted to the Union.

*Washington University was first chartered as Eliot Seminary in 1853.*

*The Academy of Science in St. Louis was founded in 1856.*

*The fourth St. Louis meeting* was held during the Christmas holidays in 1935. Approximately 2,300 people were registered and 1,200 papers read. There were 47 associated societies in session at the same time, and the total membership of the Association had grown to 18,102.

*The fourth St. Louis meeting, 1935*, was held in part in then unfinished St. Louis Municipal Auditorium. Reports from that time indicate that many last-minute changes in the program were necessitated by the unfinished condition of the building. Washington University, on learning of the situation, placed its entire plant and facilities at the disposal of Henry

and closing at noon on Friday. Included is a joint meeting on Thursday afternoon with Section I, H. H. Remmers, retiring chairman of Section I, H. H. Remmers, retiring chairman of Section Q, and Sidney L. Pressey, president of the Western Association, will be heard. The other sessions will be concerned with various aspects of educational and personnel programs in the Armed Services by those who were prominently identified with them. In this connection, Ralph Bedell (Nebraska), Henry Beaumont (Kentucky), Guy Bond (Minnesota), Alonzo Grace (American Council on Education), Shailer Peterson (Chicago), Raleigh Aloring (Michigan), and William Spaulding (Houghton Mifflin Company) may be mentioned. Other topics, such as the educational reorientation of veterans, guidance and adjustment in the public schools, postwar education, self-teaching materials, discipline, teaching efficiency, the curriculum, and the like, will round out the offerings of this Section. Owing to the importance of the subjects dealt with, a deliberate attempt has been made to prevent the overcrowding of any session with miscellaneous papers.

(X) *Science in General.* The graduate women's scientific fraternity, Sigma Delta Epsilon, will hold its National Council meeting starting at 2:00 P.M., March 1, in Parlor 106 of the Hotel Statler. The Council will remain in session through Friday morning. On Thursday, Virginia Bartow, of the University of Illinois, will speak on the subject, "American Women in Chemistry," at the luncheon for All Women in Science, and the Friday meeting of the Council will be preceded by a breakfast and the annual business meeting of the fraternity.

The National Science Teachers Association has arranged a series of meetings in partial collaboration with the Cooperative Committee of the AAAS, the National Council of Teachers of Mathematics, the Central Association of Science and Mathematics Teachers, the American Nature Study Society, and the National Association of Biology Teachers. Following committee and business meetings on Thursday afternoon and evening, a general session of the association will be held Friday morning at the Christ Church Cathedral (1210 Locust Street). The other sessions will be held in the Hotel DeSoto. On Friday afternoon recent studies and developments affecting science teaching in colleges and secondary schools will be considered. At the Leaders' dinner which will follow the afternoon session, there will be a discussion of "Unity and Action in Science Education." Saturday will be devoted to a consideration of "Science in

B. Ward, who was at that time permanent secretary of the Association.

*President Karl T. Compton* of the Massachusetts Institute of Technology, presided at the general sessions at the fourth St. Louis meeting in 1935.

*Since the Association last met in St. Louis*, the name of the St. Louis municipal auditorium has been changed to the Kiel Memorial in honor of the long-time mayor of St. Louis.

*The Society of Sigma Xi* held its fourteenth annual meeting as an affiliate of AAAS under the leadership of Professor G. H. Parker, president of the society, at the 97th meeting of the Association in 1935.

*The first annual lecture of Phi Beta Kappa* as an affiliate of AAAS, was delivered in 1935 by William Allen Neilson, president of Smith College.

*At the St. Louis meeting* of the American Association of University Professors, 1935, Dr. A. J. Carlson, chairman of the Department of Physiology, University of Chicago was elected president for 1936. Dr. Karl T. Compton made the address at the annual luncheon.

*Dr. Harold G. Moulton*, president and director of the Brookings Institution, spoke at the Thursday evening General Session on "The Scientific Method in the Investigation of Economic Problems."

*Edwin Grant Conklin* was elected president of the Association for 1936 at the St. Louis meeting.

*There were 25 requests for grants-in-aid* in 1935 totalling \$9,000, but the Committee regretfully announced through its Chairman, Walter R. Miles, that only \$3,000 was available for this purpose.

*The greenhouses of the city botanical garden* show many improvements over their condition 10 years ago when the Association last met in St. Louis. Special floral displays have been arranged for the period 23 to 30 March.

*The entire orchid collection*, about 20,000 plants, the Missouri Botanical Garden is now housed in the arboretum at Gray Summit on the northern fringe of the Ozarks overlooking the Meramec River.

*The Washington University cyclotron* is housed in a special building near Crow Hall. It is understood that visitors will be welcome during the period between the fifth St. Louis meeting.

*Saint Louis University* is especially noted for its work in medicine and seismology. It was the first institution in the world to establish a department of geophysics, and is still the only university in the United States to have a separately organized department of this kind.

*The reptile and bird houses* of the St. Louis zoological gardens are considered the best in the world.

*A modern greenhouse* known as the "Jewel Box" is located at the municipal Forest Park, which also contains the Art Museum and the Jefferson Memorial within its 1400-acre tract.

*The casual visitor as well as the engineer* will be interested in the visible evidence of the effectiveness of St. Louis' smoke abatement ordinance.

*As Science goes to press* news reaches us that Carl Snyder, vice-president of Section K, died in Santa Barbara, California, 15 February.

## Science Legislation

### The National Science Foundation: S. 1850, Final Senate Bill

Howard A. Meyerhoff

Executive Secretary, AAAS, Washington, D. C.

SCIENCE HAS ENDEAVORED to keep its readers informed on the progress of science legislation. Although it is possible to piece together a coherent story from the reports, texts of bills, and news items which have been published, the task is difficult, and there are not many who have the time to undertake it. In the belief that the legislative situation will be a topic of widespread discussion at St. Louis, a factual summary and analysis may

prove useful as a background for such discussions as occur.

Although science has played an important role in many government departments, it was not until 1945 that it featured in Congress. About three years ago Senator Kilgore, of West Virginia, drafted a bill for which scientists and the Congress were not prepared. Its premature appearance and its defects, in combination, were more than this bill could survive. One



the unfortunate aftermaths of this first science bill was a suspicion of all proposed legislation, tinged with a prejudice against anything which Senator Kilgore might introduce in the scientific field. The suspicions engendered by the first science bill seriously retarded progress in the consideration of the several bills introduced into Congress during

chronologically the first of these to appear was a bill (S. 825) introduced by Senator Byrd on 4 April 1945. Briefly, it proposed the establishment of a Research Board for National Security as an independent government agency. Its principal objective was the creation of an agency competent to formulate scientific research for the Departments of War and Navy. A somewhat similar bill was introduced into the House by Representative May on 11 June, but it was proposed that the Research Board be set up by the National Academy of Sciences in cooperation with the War and Navy Departments. It was only that the Senate really warmed up to the idea of introducing science legislation. On the 9th, Senator Fulbright proposed, in S. 1248, to set up within the Department of Commerce a Bureau of Scientific Research to encourage research and to develop inventions, products, and processes which might prove useful to business. The proposed Bureau would absorb the Office of Production Research and Development of the War Production Board and the National Inventors Council. On the 19th, Senator Magnuson introduced S. 1285, which translated into legislation the major recommendations of Vannevar Bush's Report to the President, *Science: the endless frontier*. A few days later Senator Kilgore introduced a more comprehensive bill, S. 1297, embracing many of the features of S. 1285, but including the social sciences and some patent proposals. S. 1297 differed from S. 1285 in one other important particular, namely, proposing that a National Science Foundation be administered by a Director rather than by a Board of unpaid, part-time scientists.

The overlapping objectives of the four Senate bills made the need for further study and coordination evident, and during the months of August and September Senators Fulbright, Kilgore, and Magnuson agreed to hold joint hearings on their respective bills. Meanwhile, the President's message of 6 September, though designed to stress the need of science legislation and to harmonize the proposals obtained in the several bills, in effect magnified the differences among them and created a rift that made S. 1285 and S. 1297 rival bills. Each of them slowly acquired partisan support among scientists, and the October hearings widened, rather than healed, the rift.

Starting early in August the American Association for the Advancement of Science interested itself in the legislation and made an earnest effort to secure improvements which were deemed vital if either S. 1285 or S. 1297 were to be enacted into legislation. By means of a questionnaire sent to members of the Council and distributed ultimately to approximately 600 scientists in different parts of the country, the Association obtained a sufficiently reliable background of opinion to enable it to take an active part in the hearings and in senatorial staff conferences. Over 90 per cent of the returns indicated definitely that American scientists want a National Science Foundation, and the Association regarded this strong desire of its membership as a mandate to work for the best possible legislation.

Approximately 100 scientists and a few laymen participated in the October hearings. The selection of witnesses was, for the most part, made without reference to the views which they held and, indeed, an earnest effort was made to obtain every shade of opinion from university, industrial, and government scientists, as well as from agencies and businesses whose chief concern is the application of science. Of all the witnesses, only one went on record as being opposed to the establishment of a National Science Foundation. A clear majority favored the inclusion of the social sciences in the Foundation. A majority likewise favored the Board form of administration, as opposed to administration by a Director appointed by the President. Except among the industrial groups, the interest in patent problems and issues was comparatively low, but there was a clearly defined concern about the free dissemination of results of government-supported research.

For a time it was hoped that these consolidated hearings might result in a consolidated bill, but the combination of circumstances led in the opposite direction. The old prejudice against Senator Kilgore led to a misrepresentation of his position, particularly among those scientists who, for one reason or another, favored the Board form of administration, the exclusion of the social sciences, and the exclusion of patent provisions from the bill. During November this rather miscellaneous group formed the Committee Supporting the Bush Report, which came out definitely against S. 1297 and for S. 1285. The majority of scientists, on the other hand, found themselves unable to give unqualified support to either of the two bills and so worked consistently for still better legislation in the form of a new bill. Their efforts led to the introduction of S. 1720 on 21 December. This bill, introduced by Senator Kilgore, with Senators Johnson, Pepper, Fulbright, and Saltonstall as

co-sponsors, embodied so many changes and improvements that it provided a new basis of discussion.

In January, through the intervention of Senator Thomas, of Utah, representatives of the Committee Supporting the Bush Report were brought together with Senators Kilgore and Saltonstall, and several modifications in the provisions of S. 1720 were proposed and carefully considered. On 9 February everyone concerned agreed upon a somewhat revised version of S. 1720, which was introduced into the Senate as S. 1850 on 21 February, and which will be known as the Kilgore-Magnuson Bill. In addition to Senators Kilgore and Magnuson, Johnson, Pepper, Fulbright, Saltonstall, Thomas, and Ferguson are sponsoring S. 1850.

The full text of the revised bill has already been printed (*Science*, 1946, 103, 225-230; 240) and comments on it have been made (*Science*, 1946, 103, 192). Only a brief analysis of its provisions will be attempted. It establishes a National Science Foundation with broad powers and objectives. The affairs of the Foundation will be directed by an Administrator who will be aided—and checked—by a National Science Board, composed of high-ranking scientists selected by the President. The Board shall have a voice in the selection of the Administrator, and it shall have direct access to the President and to the Congress, both in reporting on the achievements of the Foundation and in supporting or opposing specific acts of the Administrator. Within the Foundation there will be divisions of (1) mathematical and physical sciences, (2) biological sciences, (3) social sciences, (4) health and medical sciences, (5) national defense, (6) engineering and technology, (7) scientific personnel and education, (8) publications and information. Additional divisions, not to exceed three in number, may be created by the Administrator, by and with the advice of the Board. Inasmuch as the work of the natural science divisions will be guided by the carefully prepared reports of Vannevar Bush and his committees, the work of the division of social sciences is restricted until a comparable report is prepared, detailing the proposed research in this general field. Public ownership of patents and free dissemination of information arising from Foundation-supported research are provided for, but the Administrator is given latitude and discretion in regard to patents, specifically in contracts which involve substantial contributions to the development of particular inventions, discoveries, and developments on the part of the organizations to which such contracts are given.

Apart from the solution of the controversial issues, the new bill provides for a broad program of support for research and for scientific education and coopera-

tion. Scrupulous care has been taken to leave research and researchers free and unrestricted, save the Foundation may deny support when particular projects are unsound or unwarranted. International cooperation and interdepartmental coordination with the United States Government are other important adjuncts to the proposed science legislation.

Although the phraseology of S. 1850 as printed (*Science*, 1946, 103, 225-230; 240) has proved acceptable to scientists and to the Senators involved,<sup>1</sup> it may yet undergo major or minor changes when the bill is presented to the full Senate Committee on Military Affairs, and again when it is reported out of Committee and onto the Senate floor. Once proposed legislation reaches the floor of the Senate, amendment is an uphill job, but it must be remembered that a similar bill was recently introduced by Senator Wilcox (S. 1777), and that there may be some pressure from this group to secure modifications in the bill which comes from the Committee on Military Affairs, without concurrent support from the Committee on Commerce. However, it has been admitted by several of the sponsors of S. 1777 that their support was given primarily because of the rift among the scientists. S. 1777 provided for further study of the situation and commanded their support for this reason. That reason no longer exists, and it is hoped that the group of Senators will support the legislation which the vast majority of scientists approve.

The fate of the new bill in the House of Representatives is unpredictable. The May Bill (H.R. 3444) has already been passed, but it provides solely for military research. The new Senate bill incorporates many of the provisions of the May Bill, applying them specifically to the Division of National Defense, and it may be hoped that the supporters of the May Bill will find the Kilgore-Magnuson document acceptable as a substitute and as an amplification of the Government's research program. The Luce Bill (H.R. 5332), which was introduced on 1 February 1946, does not appear to be rival legislation. It proposes the creation of a Department of Science and Research, with a Secretary of Science and Research in the Cabinet. The proposed divisions of the new department do not include all of the fields of science, and the proposed groupings are open to serious criticism. The Luce Bill offers nothing which scientists

<sup>1</sup> There has been one change in the phraseology of S. 1850 as printed (*Science*, 1946, 103, 225-230; 240). In Section 4 (b), second paragraph (p. 226), the second sentence of the final draft now reads as follows: "The Administrator shall pay the compensation of such executive secretary and may furnish the Board and the divisional scientific committees such additional personnel, and such facilities, services, and supplies as may be necessary for the proper performance of the functions of the Board and the divisional scientific committees."



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support and creates the serious hurdle of obtaining recognition of a new Cabinet post. It is safe to include that none of the science legislation currently before the House will prove competitive; but, on the other hand, there is reason to believe that the Representatives are more interested in economy than they are in the support of science. There has been comparatively little opportunity for members of the House to familiarize themselves with the thinking that has gone into the Kilgore-Magnuson Bill, and it is clear that an important job of education lies ahead that the scientists are best qualified to undertake. At a time when our allies in the late war are giving generous support to science, and when American

science has lost 100,000 or more recruits in scientific research through the operation of Selective Service, it is appropriate to endorse and actively to support legislation which is designed to supplement the contributions which our industries and our educational institutions are making to scientific research. A Senator or a Representative can take intelligent action only when he is informed of the action his constituents want him to take. A resolution gets some attention, a letter from an individual is more informative, a telegram is somewhat better than a letter, but a personal call on his Senator now or his Representative a little later is the best way that an individual scientist can take positive action to ensure the passage of the Kilgore-Magnuson Bill, S. 1850.

## Science Exhibition

### Kiel Memorial Hall, St. Louis

27-30 March 1946

Now that Association meetings are again being held, it is possible to resume the important and interesting Science Exhibition. The Exhibition, which has long been an integral part of the meetings, will be housed in the Auditorium, located on Market Street between 14th and 15th Streets. The building is conveniently located with respect to the meetings of the various sections, and each will be held in nearby hotels.

The same high standards in effect during prewar years have been maintained for this year's Exhibition, and we wish to express our appreciation for the cooperation we have received from the exhibitors who have helped to

make possible this feature, which all of the members find most useful.

Some institutions and concerns who have recently decided to take part in the Exhibition were not able to send descriptive material for publication at the early date that this issue of *Science* went to press. It is our hope, however, that it will be possible to have available complete information which may be obtained at the Registration Desk to be located in the center of the Exhibition area.

At our request, the exhibitors have furnished us with the following descriptions of their exhibits:

#### A. S. Aloe Company

St. Louis, Missouri

Booth Nos. 60-61

A display of new and essential apparatus, particularly in the biological sciences, includes recent handmade microtome knives of the double hollow ground design, a new series of micro-dissection instruments, and dehydration apparatus for small batch processing. Suggestions and recommendations for the development of new laboratory instruments will be discussed with those interested at our booth.

Guests at the Science Exhibition are cordially invited to visit our new building located at Nineteenth and Olive Streets. Among the many new facilities are a modern show room where new apparatus may be thoroughly examined and also a modern chemical laboratory, complete with laboratory furniture and equipment in our display.

#### American Medical Association

Chicago, Illinois

Booth Nos. 38-39

This exhibit shows the significance of the work of the Council on Physical Medicine and the Council on Pharmacy and Chemistry in the investigation of products intended for therapeutic purposes and the interpretation of these efforts from the standpoint of human welfare.

#### American Optical Company

Buffalo, New York

Booth Nos. 153-154

The Scientific Instrument Division of American Optical Company, formerly Spencer Lens Company, will exhibit: the new Phase Microscope, a recent research development; a new Metallurgical Microscope with Vertical Illuminator; and a Polarizing Microscope in which Polaroid of optical quality replaces calcite. Other stand-

ard microscopes and instruments of the well-known Spencer quality will be on hand. Messrs. J. J. Host, W. E. Folland, G. W. Frid, J. P. Baker, and C. M. Osborne will be in attendance to discuss any optical questions presented.

### **The Blakiston Company**

Philadelphia, Pennsylvania  
Booth No. 63

The Blakiston Company have prepared an attractive exhibit of their textbooks and reference works. Important new texts in the undergraduate sciences will be announced. Every science teacher will be interested in the new Hackh-Grant's *Chemical dictionary*, reprinted with changes and additions to include the latest data, among which is considerable material on atom structure, fission, disintegration, and the resulting nuclei. Other authentic Blakiston books of timely interest are Stranathan's *The "particles" of modern physics*; Hector, Lein, and Scouten's *Electronic physics*; *The Harvard books on astronomy*, edited by Dr. Harlow Shapley and Dr. Bart J. Bok, Harvard College Observatory; *Handbook of microscopical characteristics of tissues and organs*, by Karl A. Stiles—an outline course which is finding ever-widening favor among teachers of biology interested in identification studies. Chemistry teachers will also be interested in the new edition of Pregl's *Quantitative organic microanalysis*, revised and edited by Dr. Julius Grant. Textbooks for full-term, semester, or briefer courses in the fields of chemistry, physics, and the biological sciences will be on display. Teachers are invited to discuss any textbook problems or matters pertaining to new manuscripts with the Blakiston representatives at the booth. Those in charge will be T. A. Phillips, H. W. Fry, J. B. Lackey, and J. Losacco.

### **The Jaques Cattell Press**

Lancaster, Pennsylvania  
Booth No. 149

The Jaques Cattell Press has been organized now for 5 years and this is the first opportunity it has had to really show what it has planned to do in the way of publishing authoritative scientific books of a nontechnical character. We have had a great deal of encouragement in scientific circles, and feel that we are accomplishing what we set out to do. We have published 50 volumes, but there is much important material to be written and published, and we hope to encourage more manuscripts to be written. We shall exhibit the books which we have published, samples of the circulars which we get out. We shall discuss with authors who are interested in our plans for the future on circularization and methods of distribution. There will be contained in this exhibit the 3 directories edited by Jaques Cattell: *American men of science*, *Leaders in education*, and *Biographical directory of American scholars*. Also a new company will show one or two books, called the Heck-Cattell Publishing Company, which will in the main specialize in textbooks, plans for which can be discussed

at our booth. Attendants at the booth will be Mr. Jaques Cattell and Mrs. Ruth H. Little.

### **Chicago Apparatus Company**

Chicago, Illinois  
Booth No. 97

This organization, manufacturer of physics equipment for use in elementary schools, high schools, and colleges has been in business continuously under the same management since 1908. The company is planning to exhibit a number of new items of equipment and improvements over classic models. Special attention will be given to an improved model of Singerman's Color Apparatus, which should prove of interest to those working with color and light. The display will also include a number of items for the chemist: a new water bath, Barnstead Demineralizer, analytical balances, the just popular Lindberg Engineering line of heating equipment and the new Precision Flask Heater. The exhibit is expected to be manned continuously by at least two men from the Chicago Office who will be prepared to discuss any questions regarding the equipment. Catalogues and other literature covering complete lines of all standard brands of laboratory equipment will also be available.

### **The University of Chicago Press**

Chicago, Illinois  
Booth No. 43

There will be a cooperative exhibit of scientific books from 18 University Presses. Participating Presses are the University of California, Chicago, Collegiate Press (Ames, Iowa), Columbia, Cornell, Duke, Harvard, Johns Hopkins, Michigan, Minnesota, Oklahoma, Oxford, Princeton, Rutgers, Stanford, Washington (Seattle), Wisconsin, and Yale. Mrs. L. B. Shuler and Miss Shirley Freshman, of the University of Chicago Press, will be exhibitors.

### **Clay-Adams Company, Inc.**

New York, New York  
Booth Nos. 155-156

The Clay-Adams Company, Inc., exhibit will include particularly displays of various groups of Medichrom Slides on tropical medicine, normal histology, ophthalmology, and other selected subjects. There will be other Kodachrome items such as S V E, Spencer, and TDC Projectors, Kodachrome view boxes, and cabinets. The laboratory items will include centrifuges, hematological equipment, and other material of interest to physiologists, anatomists, etc. The third group of items will include teaching material such as anatomical charts, mounted skeleton, demonstration skull, etc.

### **The Coleman and Bell Company**

Norwood, Ohio  
Booth No. 68

The exhibit of The Coleman and Bell Company, Manufacturing Chemists, will feature a display of laboratory reagents, including inorganic and organic chemicals, bio-



real stains, chemical indicators, and solutions. A number of new items developed during the war will be shown.

**Thomas Y. Crowell Company**  
New York, New York  
Booth No. 62

A comprehensive showing of college textbooks will be in the Thomas Y. Crowell exhibit. It will include a full selection of books from their college list in the fields of chemistry, political science, geography, sociology, economics, and business administration. Chemistry books will be featured at the exhibit, and along with ready published texts in this field the Crowell Company has to have dummies and possibly proofs of four new chemistry texts available for inspection. These books—*Basic college chemistry*, by Joseph A. Babor; *Semimicro qualitative organic analysis*, by Nicholas D. Cheronis; *Physical chemistry*, by John B. Entrikin; *First year qualitative analysis*, by Carl J. Jones and Aubrey E. Harvey—are now in preparation and will be available for use next fall.

**Denoyer-Geppert Company**  
Chicago, Illinois  
Booth Nos. 46-47

The Denoyer-Geppert exhibit consists of Visual Teaching Aids for the biological sciences. A large selection of wall charts in the fields of anatomy, botany, and zoology; models of human and animal anatomy and plant morphology; Kodachrome slides concerning the science of human and animal skeletons; museum mounts for zoology and botany; astronomical globes; meteorology charts; and many other items will be shown. Most of these materials are manufactured or prepared in the company's plant in Chicago. This organization is prepared to help plan a coordinated set of Teaching Aids for any course or department so that a maximum of teaching value can be obtained for a minimum of cost. Teachers are invited to discuss their Visual Teaching Aids problems with representatives attending the exhibit.

**Eastman Kodak Company**  
Rochester, New York  
Booth Nos. 53-54

The theme of the Eastman Kodak Company exhibit will be "Functional Photography"—spectrographic analysis, electron microscopy, microradiography, X-ray diffraction, stress analysis, instrument recording, photography, training films, and photographic copying papers. A great variety of photographic equipment and materials—paper, film, and chemicals—used for scientific research will be part of the exhibit, and will be available for examination and discussion. *Functional photography*, a 20-page booklet, will be distributed, and literature describing the application and technique of many of the scientific uses of photographic material will be available. Examples showing the result of the use of photographic materials in scientific research will be displayed in the

exhibit and will indicate to some extent the many possibilities for applying photographic principles to scientific problems. Time spent at the Kodak "Functional Photography" exhibit reviewing the many examples of photography, other than the more elementary uses, will be time well spent. Special Kodak representatives will be in attendance to serve you.

**J. W. Edwards, Publisher, and Edwards Brothers, Inc.**  
Ann Arbor, Michigan  
Booth No. 98

This exhibit features the reprints of basic scientific and technical books and periodicals originally published in Germany during the war. The J. W. Edwards Catalog No. 5, available at the exhibit space, lists some 500 such books republished by license of the U. S. Office of Alien Property Custodian. Examples of the facsimile reprints of 137 foreign scientific and technical periodicals published abroad during the war years (1939-40 to date) will be on display. A catalog will be distributed. In addition, examples of Edwards Brothers, Inc., education and industrial printing are to be shown and will be represented by samples of preliminary class texts, laboratory manuals, etc., and by parts of manuals and similar industrial publications. The space is to be identified by a large photo montage of industrial scenes keyed to the scientific and technical materials on display. The manner in which these important enemy research books and periodicals have been placed in the hands of American scientists will be graphically portrayed by another part of the exhibit. The Edwards representatives in attendance are prepared to discuss the materials offered and to take orders for desired books and periodicals.

**The Encyclopaedia Britannica**  
Chicago, Illinois  
Booth No. 66

A simulated classroom, with periodic showing of classroom films on a screen, will form the exhibit of Encyclopaedia Britannica Films. A scale model of a teacher and four "model" children sitting in schoolroom chairs makes up a prominent part of the exhibit, which has been designed to show Association members how classroom films should be used in educating students. The screen itself will be hung on the rear wall of the classroom. In front of it will be a blackboard and a painting of the teacher's desk, while the teacher will stand beside the board as though instructing the pupils. Films to be shown in the exhibit will be 16-mm. sound Encyclopaedia Britannica classroom films, which consist of some 500 different subjects designed to provide audiovisual instruction to students from first grade through college. Films for science courses and social sciences make up the bulk of the different subjects covered by the classroom motion pictures produced by Encyclopaedia Britannica Films in cooperation with leading educators of many principal American universities and colleges.

**Fordham University Press**

New York, New York

Booth No. 37

Fordham University Press is devoted to the publication of textbooks at the college level and of general works in the fields of literature and the arts. A representative selection from the entire active list is displayed. Among these a featured item is *College physics*, an undergraduate text in both classical and modern physics. The chapters on atomic fission are up to date and thorough. There is also emphasis on the needs of premedical and pre-engineering students. Also featured is *Fact and fiction in modern science*. This investigation of modern science research has had four printings in Eire, two in the United States, and is being translated into several foreign languages.

**Gamma Instrument Company, Inc.**

New York, New York

Booth No. 44

The exhibit of the Gamma Instrument Company, Inc., will feature a few of the scientific apparatus which this company has introduced during the past few years. Foremost among them will be the Gamma Automatic pH Meter. This is a unique development incorporating the latest achievements of electronic design. It combines great accuracy with extremely simple operation. Another new Gamma development is the Microflex Photomicrographic Camera, which employs for the first time the mirror reflex principle in an independent camera for microphotographic purposes.

**General Biological Supply House**

Chicago, Illinois

Booth No. 45

This year the General Biological Supply House will feature two new items and exhibit many which have been revised or supplemented, as well as some already familiar materials. One of the exhibits especially to be featured will be water-clear plastic blocks in which biological specimens are embedded. Sponges, echinoderms, arthropods, embryos (such as the pig), and small skulls have all been so mounted. These blocks can be roughly handled, are light in weight, and without special care will be excellent demonstrations for years. Orders can be sent in for the embedding of either your own or our specimens. Our second special demonstration is a blood-typing kit which provides a simple and very quick method for the student to observe and type his own blood. Powder, and not serum, is used. This powder, aside from being less expensive, makes the typing much easier and gives a definitive test in one minute. This kit will be demonstrated at our booth. Kodachromes covering many biological fields will be projected for inspection. Microscope slides from diatoms to whitefish will be visible by microprojection and microscope. Copies of our publication, *Living specimens in the school laboratory*, will be on display, as well as new editions of our *Bacteriology* and *Microscopy* booklets.

**Gradwohl Laboratories**

St. Louis, Missouri

Booth No. 71

This exhibit will show facts regarding blood-grouping sera, particularly the Rh factor. These laboratories are prepared to furnish the following: 1) tested laboratory reagents, 2) a monthly digest of laboratory literature, and 3) training school for laboratory technicians. Full literature will be furnished at the booth.

**The Graf-Apsco Company**

Chicago, Illinois

Booth No. 110

An outstanding example of what can be done in rebuilding used equipment is demonstrated in the exhibit of the Graf-Apsco Company. Here are shown microscopes from the simplest to the most complete research models. Rebuilding microscopes is also a highly specialized feature of this firm. See what can be done in restoring preciseness to otherwise expensive worn-out equipment. The Graf-Apsco Company is the originator of rebuilt microscopes in America. Its excellent service in restoring and prolonging the life of microscopes and microtomes is unchallenged over the years. Also in the exhibit are dissecting instruments and other essentials in the teaching of biology.

**W. A. Hammond Drierite Company**

Xenia, Ohio

Booth No. 145

Our exhibit will illustrate many applications for Drierite, the desiccant used in industry, commerce, laboratory, and the home for drying solids, liquids, and gases. Samples of Regulate Drierite, Du-Cal Drierite, Indicating Drierite, and Moulded Drierite will be on display. The color change from blue to red which takes place in Indicating Drierite on absorbing moisture will be demonstrated. Various containers charged with Drierite and used for drying closed compartments, chemical balances, refrigerants, dual window spaces, home closets, and basements may be inspected. Photos and data will be available to illustrate industrial twin-tower drying installations for drying air, gases, and organic liquids. Also exhibited will be a Cryochem apparatus used for dehydrating biological serums without injury, the Anhydrostil—a convenient laboratory and production device for drying organic liquids in the vapor phase, and a portable unit combining blower and Drierite cartridges to make dry air readily available at scattered locations as needed. Dr. W. A. Hammond and Mr. J. L. Ledeen will be at the booth to offer technical assistance to visitors.

**Laboratory Equipment Corporation**

Benton Harbor, Michigan

Booth No. 122

The exhibit will consist of a power unit, and combustion furnace capable of attaining a temperature of



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000° F. This furnace was especially designed to give economical performance at a continuous operating temperature of 2,600 to 2,700° F., this being the required temperature for combusting of samples in the new sulphur analysis method as described by A.S.T.M. In connection with the combustion furnace, the sulphur-determining apparatus, capable of giving a 3-minute sulphur determination of irons and steels, will be displayed. Having introduced and developed the Volumetric Carbon Determinator in this country, we are also showing the very latest 2-minute Carbon Determinator. Samples of pump-blown glassware will be displayed, and certain ceramic parts used in metallurgical analyses will be shown as examples of the type of glassware and ceramic parts this company is capable of manufacturing for the trade.

### The Macmillan Company

New York, New York  
Booth Nos. 143-144

The book exhibit sponsored by the Macmillan Company consists of approximately 700 titles, including publications of the Cambridge University Press. In addition to undergraduate and graduate textbooks and reference works there will be a large number of technical and scientific books of interest to the general reader. Books in the fields of various hobbies and avocations—photography, gardening, radio, outdoor life, and others—are represented, as are books of special interest to young readers. The major classifications are Agriculture, the Biological Sciences, Chemistry, Engineering, History and Philosophy of Science, Home Economics, Mathematics, Medical Science, and Physics. Representatives of the Macmillan Company at this exhibit are Mr. J. B. Bennett, Jr., Mr. Tyler Buchenau, Mr. J. G. Case, Mr. Sidney B. Crawford, II, Mr. Frank A. Driskill, and Mr. Joseph G. Sutton, Jr.

### McGraw-Hill Book Company, Inc.

New York, New York  
Booth Nos. 157-158

In the McGraw-Hill exhibit you will find several hundred texts and reference books representative of our publishing programs in virtually all fields of science, engineering, and technology. Many of these books are new publications, constituting the most up-to-date and authoritative texts available and frequently reflecting recent advances resulting from wartime experience. In addition to these latest contributions, the exhibit contains many revisions of standard texts, handbooks, manuals, and other important contributions to the literature of various fields which will be of vital interest to teachers, research workers, and technicians. The following members of the McGraw-Hill Book Company staff will be in attendance: Curtis G. Benjamin, vice-president in charge of the Educational Division; Harry P. Graves, vice-president and manager of the College Department; Edward E. Booher, vice-president in charge of Technical and

Business Education, and School Departments; and Kenneth B. Demaree, editor, Physical and Natural Sciences.

### G. & C. Merriam Company

Springfield, Massachusetts  
Booth No. 151

The G. & C. Merriam Company exhibit will consist of a sample display of the various publications of the company which we list herewith: Webster's *New international dictionary* (2nd ed.), Webster's *Collegiate dictionary* (5th ed.), Webster's *Dictionary of synonyms*, and Webster's *Biographical dictionary*. In addition, there will be displayed for distribution copies of various pamphlet material dealing with the instruction in, and the use of, the various books mentioned above. Souvenirs will be provided.

### The C. V. Mosby Company

St. Louis, Missouri  
Booth No. 121

The C. V. Mosby Company, scientific publishers, will exhibit a diversified line of publications. All parties attending the St. Louis meeting are cordially invited to look over the Mosby books and browse through our publications. Courteous attendants will be available to assist. Among the newer publications to be displayed will be the following: Kleiner's *Human biochemistry*, Main's *Synopsis of physiology*, Hoskins-Bevelander's *Essentials of histology*, Arnow-Reitz's *Organic and biological chemistry*, and Dougherty-Lamberti's *Textbook of bacteriology and immunology*.

### National Geographic Society

Washington, D. C.  
Booth Nos. 58-59

The National Geographic Society's exhibit presents a backdrop display of maps, supplements of the *National Geographic Magazine*, and striking natural color photographs from the latter, projected by an automatic slide machine. Among the maps shown will be copies of charts similar to those which played an important role in winning World War II. Several million of the Society's charts were used by United Nations Armed Forces from the Pentagon at Washington to the battlefields of the European and southern Pacific theaters. On two occasions, the Society records, members of our forces navigated long distances to safety with National Geographic maps their only guides.

### National Research Corporation

Boston, Massachusetts  
Booth No. 84

The Alphasatron Vacuum Gauge, operating by the ionizing power of alpha particles from a radium source, measures pressure of any gas or mixture from 0-10 mm. of Hg with linear response. Sensitive and accurate in reading, but durable and simple for industrial use, this gauge, just released from the development laboratories of National Research Corporation, covers an important

pressure interval which has not been adequately gauged heretofore. A working model demonstrates the action of the gauge, and a cutaway model shows the simple construction and principle of operation. Another item in the exhibit is a packaged pumping and gauging system capable of producing a vacuum of approximately .000001 mm. of Hg in an 18-in. bell jar. This piece of equipment was developed for evaporating low-reflective magnesium fluoride coatings on optical elements and metallic reflective coatings on glass and plastics. By a revision of the accessories mounted on the baseplate, the evaporator becomes a versatile laboratory tool for electronic research. Introduction into the evacuated chamber of electric currents, high voltages, liquids or gases, and controllable motion through specially designed seals gives the experimenter or tube designer an opportunity to work with continuous and measurable variables. Other items on display will be thermocouple and ionization gauges and controls and a 2-in. all-metal diffusion pump.

### **Purdue University**

Lafayette, Indiana  
Booth No. 41

This exhibit will feature germanium semi-conductors and crystal rectifiers (results obtained in connection with and under Contract OEMsr-362, Office of Scientific Research and Development; Purdue Research Foundation case No. 184). Various samples of germanium semi-conductors with widely different electrical properties, such as resistivity and thermoelectric power, will be exhibited. Different types of crystal rectifiers made from these materials—low and high frequencies and high back-voltage rectifiers—will be exhibited and their characteristics demonstrated with the aid of oscillographs. The change of contact properties of crystal rectifier contact under the action of heat and light will also be shown. This exhibit will be accompanied by charts illustrating the fundamental electrical properties of semi-conductors as a function of impurity content.

### **W. B. Saunders Company**

Philadelphia, Pennsylvania  
Booth No. 67

The exhibit includes a complete line of textbooks and reference books dealing with the medical and biological sciences. Of special interest are the following new books: Herrell's *Penicillin*, Mackie, Hunter, and Worth's *Tropical medicine*, Ash and Spitz's *Pathology of tropical diseases*, Masserman's *Principles of dynamic psychiatry*, Cantarow and Trumper's *Clinical biochemistry*, Olson's *Prevention, emergencies and first aid*; and the new editions of Marshall's *An introduction to human anatomy*, Greaves' *Elementary bacteriology*, Frobisher's *The fundamentals of bacteriology*, Millard and King's *Human anatomy and physiology*, Howell's *Textbook of physiology*, and Jordan and Burrows' *Textbook of bacteriology*. The representatives present during the convention are: Messrs. John A. Behnke, O. G. Enstrom, Paul E. Koerfer, Walter S. McKay, H. M. Cook, and A. M. Greene.

### **The Science Press Printing Company**

Lancaster, Pennsylvania  
Booth No. 150

The Science Press Printing Company prints about scientific journals, and will have copies of these exhibit, not only to show the extent of the work The Science Press Printing Company, but to make sort of a headquarters for our Editors who are welcome to use our booth at any time. We print many books as well as periodicals and they also will show the printing which emanates from the press. While The Science Press Printing Company has many more journals offered for publication than can be accepted we shall be glad to discuss and be of service to anyone attending the meeting in regard to their printing problems with a view to eventually working with them on printing a journal book. The Science Press Printing Company during the war period succeeded in keeping a fairly regular schedule. We feel confident for the future because we have the Editors which we are dealing with have complete confidence in our knowledge of the importance of scientific printed matter. We hope that we can continue to serve science by the printed word for many years to come. Attendants at the booth will be Mr. James Cattell, our president, and one of his printing assistants.

### **Sparkler Manufacturing Company**

Mundelein, Illinois  
Booth No. 146

Sparkler Manufacturing Company will exhibit a Laboratory Model Horizontal Plate Filter in operation. The model has sidewalls of glass and visibly demonstrates the efficiency and ease of Horizontal Plate filtration. Also on display, but not in operation, is a stainless steel Laboratory Filter, in standard construction, mounted with pump and motor on a portable stand with ball bearing casters.

### **Statham Laboratories**

Los Angeles, California  
Booth No. 133

The exhibit of Statham Laboratories is designed to bring to the attention of scientists the properties of Statham instruments. The Statham Gage is an unbonded strain gage which is capable of measuring deflections as minute as 0.000008" and force changes as small as 0.02 oz. This is accomplished without need for expensive electronic equipment. In the simplest case, a flashlight battery, a Statham Gage, and a microammeter are all the equipment required. It will be obvious to the trained worker how such equipment may be incorporated with advantage in research apparatus such as, for instance, dilatometers. The high sensitivity and stability of the Statham Gage enable its incorporation into other instruments which also will be shown. The Statham Accelerometer can measure acceleration with full scale range as small as  $\pm 2$  g or as great as  $\pm 200$  g. The output is sufficient for direct operation of recording equipment without need for electronic amplifiers. The Statham



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Pressure Pickup enables remote indication or reading of liquid or gas pressures over ranges of pressures as small as  $\pm 2$  in. of water or as great 0-10,000 per square inch.

### The Technicon Company

New York, New York

Booth Nos. 64-65

The Scopicon is a unique microslide projection apparatus embodying several innovations which endow it with extraordinary versatility. For small-group study or con-  
tion, it is used in conjunction with a table-mounted chamber fitted with 10 viewing hoods. The magni-  
image is then projected upon a viewing platen  
ed within the dark chamber. For auditorium or  
room demonstrations, the Scopicon projector unit  
be quickly uncoupled from the table and employed  
wall-screen projection, achieving brilliantly and  
ly-lit images six feet or larger across, even under  
mersed microscopic powers. This remarkable mag-  
nation and even illumination rise from the utilization  
high-pressure mercury-arc light source and a highly  
ent optical system. Accessory devices quickly adapt  
Scopicon for microphotography. The Autotechnicon  
an instrument which automatically processes tissues.  
steps in the processing sequence—fixation, washing,  
hydration, clearing, infiltration, and staining—are per-  
formed according to the requirements of any elected  
techniques. Fully automatic operation assures unvary-  
ing uniform results. The Technicon "Lab-aid" filing  
cabinet has interchangeable drawers for filing either  
or 2-in. microslides, Kodachromes, transparencies,  
slides, and up to 4½-in. lantern slides. The single-bank  
drawers, moving on smooth-tracking rails, provide the  
convenient answer to the pathologist's filing problem. The  
Technicon Company will also exhibit their Constant Tem-  
perature Water Bath and the Technicon Pipette Washer.

### United States Public Health Service

Atlanta, Georgia

Booth No. 129

This exhibit is divided into two units. The first of  
consists of seven display cabinets containing a  
series of sixty-three 8 in.  $\times$  10 in. colored transparencies  
depicting the life cycle, geographic distribution, pathol-  
ogy, symptomatology, treatment, and diagnosis of Schis-  
tosomiasis. These transparencies are excerpts which  
have been taken from a more complete film strip about  
the infection. The adjoining section of the exhibit con-  
sists of a projection booth provided with seats, in which  
colored-film strips with accompanying recorded de-  
scriptive narrations will be shown. These are entitled  
"Schistosomiasis," "The Laboratory Diagnosis of  
Schistosomiasis," and "The Identification of the Fe-  
male Anophelines of the U. S." and will be shown at  
the convenience of the viewers. The film strips and  
recordings are being offered to all interested individuals  
and institutions as aids in the teaching of parasitic dis-  
eases. Since this is a relatively new device in the field  
of parasitology, all comments and criticisms concerning

such audiovisual materials will be most helpful in at-  
tempting to evaluate them.

### Ward's Natural Science Establishment, Inc.

Rochester, New York

Booth No. 69

Ward's Natural Science exhibit will include the Muel-  
ler-Ward models of Frog Embryology, Comparative Zool-  
ogy, Comparative Embryology, and the Wilson-Ward  
models on the Embryology of the Human Face. Ward's  
new Plastic Corrosion Preparations will also be on dis-  
play. These are colored plastic casts of the circulatory  
system and make a spectacular demonstration. An ex-  
hibit of Ward's new Bio-Plastic mounts will also be  
made. These consist of biological and geological speci-  
mens embedded in clear plastic. Ward-Color slides will  
also be displayed. These are far superior to ordinary  
Kodachrome duplicates. Other modern teaching mate-  
rials will be exhibited. A complete set of Ward's cata-  
logues, booklets, and bulletins will be included in the  
exhibit and members of the staff will be present.

### W. M. Welch Manufacturing Company

Chicago, Illinois

Booth No. 70

This exhibit will include: scientific instruments and  
laboratory apparatus for college, university, and research  
laboratories; teaching apparatus such as Force tables,  
Boyle's law, photometers, spectrometers, etc.; instru-  
ments such as voltmeters, ammeters, galvanometers, re-  
sistance boxes, balances, etc.; a complete line of vacuum  
pumps; biological laboratory equipment such as speci-  
mens, mounts, skeletons, charts, etc.; and a complete line  
of postwar, American-made instruments especially worthy  
of consideration at this time for planning for GI train-  
ing courses.

### John Wiley and Sons, Inc.

New York, New York

Booth No. 147

John Wiley and Sons, Inc., will have for examination  
over 100 titles of its scientific books in such fields as  
chemistry, agriculture, biology, geology, geography,  
mathematics, mineralogy, psychology, physics, astronomy,  
etc. These books will be on display in the Science Li-  
brary and in Booth No. 147. The booth exhibit will con-  
centrate largely on the latest Wiley publications of par-  
ticular interest and significance. Among the new books  
to be shown will be A. Taylor's *Introduction to X-ray  
metallography*, the second edition of J. Yarwood's *High  
vacuum technique*, Harry Barron's *Modern plastics*, and  
*Electron optics and the electron microscope*, by V. K.  
Zworykin, G. A. Morton, E. G. Ramberg, J. Hillier, and  
A. W. Vance. Other prominent new books on display  
will be Gideon S. Dodds' *Essentials of human embry-  
ology*, S. C. Prescott, C. A. Winslow, and M. H. Mc-  
Crady's *Water bacteriology*, J. D. Forrester's *Principles  
of field and mining geology*, and many others. Anyone  
attending the meeting will be welcome to inspect these  
and other Wiley titles on display.

# Letters to the Editor

## Pectin Intravenously

In his communication under the above title Hueper (*Science*, 1945, 102, 233) commented on our note, "Uronic acids in animal bodies" (*Science*, 1945, 101, 670). We believe he may have overlooked our intent, which was to emphasize the importance, wherever practicable in future biological studies, of differentiating between glucuronic and galacturonic acids rather than masking probably galacturonic values under the designation glucuronic acid.

We suggest that those interested in the use of intravenous pectin should read carefully the complete articles referred to by Hueper as well as others which have appeared in medical literature. Because of space limitations neither our note nor Hueper's could treat this subject adequately.

W. E. BAIER, E. F. BRYANT, G. H. JOSEPH,  
and G. H. PALMER

Research Department

California Fruit Growers Exchange, Ontario, California

## Genetical Studies of the Sesame Flower

A preliminary study of the flower of sesame (*Sesamum indicum* L.) has revealed 33 morphological and 30 color differences among the many varieties and hybrids in the collection of this department. The mode of inheritance of 24 of these basic flower types has been determined, showing simple segregations, modifying factors, complementary factors, multiple alleles, duplicate factors, and five cases of linkage (the first to be described in sesame).

Of particular interest is a type with all five lobes of the corolla completely separated, in contrast to the usual tubular form. Some of the other characters include the colors yellow, red, and purple in different intensities and distributions fused anthers, tuft of hair, double flower, double lip, elongated cells in the foveola, and glabrous.

These flower differences, in addition to supplying a wealth of material for determining the linkages of numerous other characters previously reported (D. G. Langham and Maximo Rodriguez. *Boletin No. 2, Instituto Exp. Agric.*, Caracas, Venezuela, June, 1945) and in study, may be extremely useful in a study of the geographic distribution of sesame with special reference to its place of origin.

D. G. LANGHAM

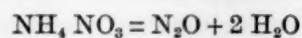
Instituto Experimental de Agricultura  
Caracas, Venezuela

## A Possible Source of Atmospheric N<sub>2</sub>O

The existence of nitrous oxide (N<sub>2</sub>O) in the earth's atmosphere has been established by the discovery and analysis of an absorption band at 7.77  $\mu$  in the solar spectrum (A. Adel. *Astrophys. J.*, 1939, 90, 627; 1941, 93, 509). The origin of this gas in the atmosphere is still in doubt, for its presence is not readily explained

by the photochemistry of the air. It is the intent in what follows, to call attention to an apparently plausible and interesting means of accounting for the phenomenon.

In recent examinations of soil air for hydrocarbon content, M. W. Kriegel, of the Carter Oil Company, Tulsa, Oklahoma, has found a hitherto unreported component; and on the basis of careful investigation of properties, he suggests that the gas is very probably nitrous oxide (*Geophys.*, 1944, 9, 447-462). Kriegel points out that "nitrous oxide in the soil is not surprising when it is remembered that the element nitrogen in the form of ammonium salts, nitrites or nitrates is present in fertile soils; and that one method of preparation of pure Nitrous Oxide is according to the equation



It is also probable that the slow decomposition of commercial fertilizers might account for some of the Nitrous Oxide in farming areas. In connection with the study of decomposition of vegetation under aerobic conditions it has been shown by this laboratory that a gas having properties similar to Nitrous Oxide forms a large portion of the condensed fraction."

If, as appears to be the case, it is indeed true that soil air contains N<sub>2</sub>O, is it not reasonable to assume that escaping soil air to be one source—perhaps the principal one—of the atmospheric nitrous oxide layer?

ARTHUR A.

Randall Laboratory of Physics, University of Michigan

## The Function of Psychology

These remarks are suggested by reading the article by Captain Jenkins (*Science*, 1946, 103, 33-38), which seems to me too diffuse.

In a certain sense, it may be claimed that psychology is the most important of all sciences, since the fate of the human race, and even its existence, depends on the actions of people, and those actions depend on their knowledge and beliefs.

I find myself with certain opinions, including opinions about psychologists. How did I come by them? Perhaps as the result of teaching, partly from direct experience. Owing to various inventions, such as those of the telescope and microscope, I find myself able to be dimly aware of many phenomena which would be imperceptible to my unaided senses. This extension of the senses has been so remarkable in recent years that the range of direct observation or experience has been enormously extended. But a single mind cannot compass all the things, and for the most part I have to depend on others to see what I might have seen, to hear what I might have heard.

Thus, at the beginning of the century the age of various geological strata was carefully estimated by



ent geologists, but the physicists were presently able to give convincing reasons for increasing these estimates about tenfold, and these results have been meekly accepted by the geologists and biologists. Superimposed, perhaps I should say underlying, all these observations, direct and indirect—the material of science—is a body of overbeliefs, resulting from tradition, and fed by the emotions. We cannot escape from these, or abandon our sense of human values. A great dilemma of modern life results from the fact that some or many of the ancient beliefs do not accord with the findings of science, and people live, as it were, in two worlds, one of practical realities, and one of the emotions. The reconciliation of these discrepancies is one of the great tasks for the future. What have the psychologists to say about this? What has science to say about it? What is the verdict of religion?

The great tasks of education are twofold: to educate the mind, or the senses, so that the findings of science may be available to all, not as rigid dogma but as reasonable approximation to truth, certain to be largely extended and modified in the future; to educate the feelings, the social senses, so that the welfare of all mankind becomes in a measure that of every individual, the happiness of all the happiness of each.

T. D. A. COCKERELL

Box 411, Palm Springs, California

ditions, increased the rate of water loss. Perhaps this was owing to increased heart action and respiration to be expected in such a high temperature, for the expired air had a PSD of 1.0 mb, or 3.0 mb lower than the inhaled air, which was the same as the reduction in PSD from the 4.7 to 4.9 of inspired air to the 1.7 mean of exhaled air in the general test. The hot moist air (50° C., 49 per cent rel. hum.), with a PSD of only 0.2, naturally, reduced the rate of water loss considerably. Indeed, it appears, from the fact that the expired air (at 39.4° C. and 74 per cent rel. hum.) had a PSD of 1.0 mb, that there was condensation of vapor in the body!

CHARLES F. BROOKS

Blue Hill Meteorological Observatory  
Harvard University

### Rediscovery in the Vitamin A Field

It is becoming increasingly troublesome to verify whether or not one has made a discovery, or merely a rediscovery. However, if the matter seems worth publishing, courtesy surely demands the admission that no thorough literature search has been made when this is so.

According to recent communications to this journal (*Science*, 1945, 101, 585; 102, 158) the blue colour developed on treating vitamin A with various acid earths has been independently discovered three times, by Lowman, by Meunier, and by Emmerie and Engels. [For references, see *Science*, 1946, 103, 175.] It is possible to add a fourth and probably the original discoverer to the list, namely Takahashi (K. Takahashi and K. Kawakami. *J. chem. Soc. Japan*, 1923, 44, 590), who published the observation no less than 16 years before the earliest reference previously quoted.

Similarly, the fact that the greater part of the vitamin A of fish-liver oils is present as fatty acid esters has been independently discovered at least three times. K. Hickman (*Ind. eng. Chem.*, 1937, 29, 1107) confirmed the observation by analytical molecular distillation but referred to no earlier work. In a recent paper from the same laboratories (H. Koscher and J. Barter. *Ind. eng. Chem. (Anal. ed.)*, 1945, 17, 499), priority is accorded to L. Reti (*C.R. soc. Biol.*, 1935, 120, 577), who used partition methods. The original observation, also using partition, was published by A. L. Bacharach and myself seven years earlier (*Quart. J. Pharm.*, 1928, 1, 539).

E. LESTER SMITH

Glaxo Laboratories, Ltd.  
Greenford, Middlesex, England

### Freedom of Science in Soviet Union

We followed with great interest the exchange of views between Dr. Karl Sax, of Harvard University (*Science*, 1944, 99, 298–299; 1945, 102, 649) and Dr. Anton R. Zhebrak of Timiriazev Agricultural Academy, USSR (*Science*, 1945, 102, 357–358).

K. Sax wisely leaves unchallenged some purely political questions raised by A. Zhebrak. If a one-party state with a system of election when the population has

### Water Loss From the Respiratory Tract in the Tropics

The interpretation of Dr. Burch's valuable data (*Science*, 1945, 102, 619–620) on water loss from lungs, in so far as this is a function of the temperature and humidity of the inspired air, would be facilitated, I believe, if he used values of humidity in terms of physiological saturation deficit rather than of relative humidity. Physiological saturation deficit, a term I am now inventing or reinventing, is the difference between the absolute humidity of the air and what the absolute humidity would be at saturation at body temperature. Since it would be impossible for the lungs to evaporate any moisture into air already saturated at body temperature, the PSD represents the opportunity for evaporation from the lungs.

I have derived the PSD's for the temperature and humidity conditions presented by Dr. Burch, with the following results. It is convenient to work in terms of the deficit of the vapor pressure of the air relative to that at saturation at body temperature, 6.2 mb. The PSD's for the conditions under which most of the measurements were made (20.0 to 21.1° C. and rel. hum. 35 to 60 per cent) were 4.7 to 4.9 mb. The PSD for the cool, foggy air (15° C., 97 per cent rel. hum.) was 4.6 mb, and of cool, dry room air (15° C., 60 per cent rel. hum.) 5.2 mb. Since these humidity conditions differ by only 4 to 8 per cent from the standard test conditions it is natural that they influenced the rate of water loss relatively little.

The hot dry air (50° C., 18 per cent rel. hum.), though its PSD was, at 4.0, less than under the standard con-

no choice of candidates and must vote a straight communist ticket is called "a highest form of democracy," it is clear that American and Soviet concepts of democracy are so far apart that there cannot be a constructive debate on that point.

Let us turn to another statement by A. Zhebrak, "that science can be free in a centralized socialistic state" and that the opinion of K. Sax that "science must conform to political philosophy" in USSR is wrong.

We must state most emphatically, on the basis of our personal experience in USSR, that K. Sax is absolutely right. All groups of population in Soviet Union are living under terrific political pressure and the state is regulating everything and interfering in everything, and this cannot be different because the state is supreme and absolute and the individual is just nothing. Freedom, as Americans understand it, is simply nonexistent in USSR. The scientists are not exceptions to a general rule, although they enjoy some privileges and their standard of living is much higher than that of other less fortunate subjects of Soviet Union.

Let us take a glaring example, about which A. Zhebrak keeps a modest silence. We mean the case of academician N. I. Vavilov, who "was arrested by NKVD in the summer of 1940 and has been kept in custody since then" (*Chronica Botanica*, 1941, 6, 429). We have now reliable information that Vavilov died in a concentration camp in Siberia in 1942.

We can understand the reasons for Zhebrak's avoiding the issue. What ironical commentary on the freedom of science in USSR is the fact that one of the most famous Russian scientists, who rendered outstanding service to his country and who was so respected in USA, could be put to a certain death in a concentration camp for no other reason than his scientific views were found not to be in conformity with Marxian ideology (Vavilov-Lysenko controversy)! But the most disturbing fact is that the case of Vavilov is by no means an exception. We know that hundreds of less-known Russian scientists are dying slowly in Soviet concentration camps which can compete quite favorably in atrocities with Belsen, Dachau, and other Nazi horror camps. Although we can cite the names of some of these unfortunates we have some very sound reasons not to do this. The first rule of all totalitarian states—silence is golden—is known not only to A. Zhebrak but also to us. We talk about Vavilov only because we are sure that he is dead.

K. Sax asks "why and how Vavilov died." He can find the answer to his second question in a book written by a well-known Russian scientist, Prof. Chernavin, *I speak for the silent*, which gives a true and very vivid picture of the life of scientists in the Soviet Union and explains why their careers end sometimes in jail. Prof. Chernavin spent considerable time in various concentration camps and eventually escaped from one of them to Finland, so he can be considered a specialist on this subject.

Although probably 12–15 years elapsed since Chernavin's book was written, our information gathered from the persons who returned only recently from Soviet Union

convinced us that nothing was done there to promote the cause of freedom in general and freedom of science in particular. A few privileges granted to scientists are not enough to change the general picture. And although A. Zhebrak describes very eloquently the progress of science, especially in his field (plant genetics), we earnestly believe that the achievements of scientists in USSR would be much more impressive if the fundamental conditions for that—freedom of scientific research and freedom of discussion and criticism—existed in that state.

We are afraid that A. Zhebrak hardly will understand us. We are probably talking again different languages although we both were born in the same country. And this fact is significant in itself. The difference in concepts of such fundamental things as democracy and freedom, which appeared only after the revolution of 1917, is the result of 28 years of most persistent, shrewd and vicious propaganda to which all citizens of the Soviet Union are subjected day after day. It is interesting to note that even scientists are not immune to this scourge of our time.

VLADIMIR C. ASMUND

*Arnold Arboretum, Harvard University*

#### Present Status of Foreign Herbaria and Museums

Although the war has brought about tremendous advances in most branches of science, it has resulted in irreparable losses to systematic biology. Losses of some of the reservoirs of basic data of these sciences, the herbaria and museums that have been destroyed or damaged, are like the results of the fall of the legendary Humpty-Dumpty—all the king's horses and all the king's men cannot restore them. Similar specimens may be accumulated to replace those destroyed, if the places from which they came have not been completely altered, but if a species has been based on a specimen, there is no conceivable way of filling its place if it is lost. Much destruction of this sort has occurred during the war just ended and is likely to continue to occur because of a lack of interest during the period of reconstruction, and because of loss and lack of replacement of competent curatorial personnel.

Systematic botany and zoology differ from most other branches of biology in that the sources of their data can be preserved in relatively permanent form in herbaria and museums. Collections of specimens, together with libraries in which are preserved the records of the circumstances under which the specimens were collected as well as the results of hundreds of years of study, form the essential equipment of the biological systematist. With these collections and libraries as the reservoirs of data, the student may identify plants and animals, construct classifications, work out comparative morphology, stabilize nomenclature, reconstruct phylogeny, plot and interpret geographical distribution, and with newer techniques study the structure and behavior of populations. Since the collections are carefully preserved and filed, the work in these fields does not rest merely on observations of ephemeral phenomena recorded by human hand



on the actual material observed, which may be conducted and verified at will by future workers.

Classification and the identification of material is also fundamental to all other types of biological research. It is the foundation of the language used by the workers in other fields by which they can communicate and compare their results. The classification of the plant and animal kingdoms has well been compared to the map plus directory of a great city.

Within certain limits systematic biologists have traditionally carried on almost ideal cooperation. The doors of herbaria and museums have always been open to all qualified workers from whatever institution or country. Material has been lent back and forth in great quantity to facilitate the work of those who cannot travel extensively or who need to study more specimens than they have at hand. Exchanges and deposits of specimens build up the large collections needed for adequate study. Anyone who obtains a specimen and places it in a museum is assisting with the work of countless future workers, most of whom he will never see. This is the spirit upon which all science is founded, and it is especially well developed in the oldest branch of biology, systematics.

The losses sustained in the war are thus not of merely local interest to the institutions or countries which have incurred them. They are losses to biology as a whole, and all workers in systematic biology may well be seriously concerned.

It is our purpose as botanists here to call attention to the fact that no concerted effort has been made or is being made to ascertain the extent of these losses, the fate of specimens borrowed from the American institutions, or the steps needed to avert further losses and to repair, in so far as possible, the damage that has been done. The need for such an early inventory should be readily appreciated, and its practicality can hardly be denied in the face of the sending abroad of specialists commissioned to make inventories in the interest of salvaging all sorts of things: objects of art, historical documents, and monuments as well as military and industrial data. With further delay it will be a peacetime "too little and too late."

Systematic botany has traditionally been ill-supported, and most accomplishments over and above routine duties have been the result of the personal initiative of the botanists, and at their own expense or, rarely, at the expense of wealthy benefactors. The task of making an inventory of the losses sustained by, and the present condition of, botanical institutions in war-torn countries, however, might well be considered a legitimate project for a governmental agency. Because of the difficulties in travel, the expense involved, and the disagreeable living conditions in the countries concerned at this time, it is likely that no one would care to undertake such a task on his own initiative. Restrictions on foreign travel would, moreover, make it absolutely necessary that such a project have active governmental backing especially authorized in the Department of State. Obviously, no

effort should be spared to secure for such work American specialists, both in cryptogamic and in phanerogamic taxonomy, technically qualified by a comprehensive knowledge of botanical history and by broad experience in herbarium practices. The task is scarcely one to be left to persons lacking these qualifications who may be found within the region.

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### Recent Contributions to the Theory of Random Functions

There is a rapidly growing interest in statistical problems where one has not to deal with a single numerical random variable or a finite collection of them, but instead, with an infinite sequence of numbers given at random, or a continuous random function. One thinks of the coordinates of a particle in the Brownian motion, or the path of a molecule in a gas, or the "noise" potentials in electrical machines, as being random functions in this sense.

The recent work in this field provides an excellent example of the impediment which the common irrelation between allied disciplines may place in the way of scientific advance. A large fraction of the methods and ideas of this subject has been rediscovered since 1940 by physicists and electrical engineers, almost wholly unaware that the same problems had been raised and solved in the mathematical literature a decade before. What differences exist in treatment or proof are either notational, or minor ones dictated by the traditional opposition between the physicist's ability to make physical intuition bolster an heuristic argument and the mathematician's demand for maximum rigor and generality.

The particulars are these: In a series of papers, the results of which have been summarized (N. Wiener. *Acta Math.*, 1930, 55, 117-258; R. E. H. C. Paley and N. Wiener. *Amer. math. Soc. Colloq. Publ.*, 1934, 19), N. Wiener develops a theory of Gaussianly distributed random functions, both in the wholly independent case with a "white" spectrum and the more general one with an arbitrary "power spectrum." He derives a general formula, in the form of a definite integral, for calculating the average of any function or functional of one or two such random functions—or any number, by obvious extension (*Amer. math. Soc. Colloq. Publ.*, 1934, 19, 152). The discussion proceeds from a theory of formal Fourier series with Gaussianly distributed coefficients (pp. 147, 151). This is called the "Method of Rice" by M. C. Wang and G. E. Uhlenbeck (*Rev. mod. Phys.*, 1945, 17, 323-342) in view of the extensive use made of it in S. O. Rice's review of 1944 (*Bell Syst. tech. J.*, 1944, 23, 282-332; 1945, 24, 46-156).

All of the fundamental methods presented by Rice, except for the discussion of the shot effect, are to be found in this work of Wiener. A large part of the special results may be obtained easily by substituting in Wiener's

general formula and evaluating or approximating the resulting definite integral by the usual methods of function theory. To this class belong, for example, the results of Sections 3.1 and 3.2 in Rice on the distribution of the values of the noise at various times, and those in Part IV on the average of various properties of the response of nonlinear devices to Gaussian noise. Indeed, the fundamental formula of the "correlation function method" (4.07, p. 132), ascribed to Van Vleck and North (1943) with references to Fowler and Rice (1942) and Fränz (1941), is Wiener's formula for the case of a function of two random functions.

It is, of course, true that much of this recent work has constituted a real advance. One need only cite the important work of Kac on zeros of random functions and that of Rice and others on the response of nonlinear devices with random inputs confined to narrow-frequency bands, the low-frequency component of the response, envelopes, etc. On precisely this account it is a greater pity that this further work could not have commenced when the basis was first obtained by the pure mathematician, in which case we should be a decade further today.

It is worth remarking in this connection that certain recent mathematical papers of R. H. Cameron and W. T. Martin on the evaluation of Wiener integrals (*Trans. Amer. math. Soc.*, 1945, 58, 184-219) are highly relevant to nonlinear noise problems.

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### A Publicity Victim

In my book, *The natural gardens of North Carolina* (pp. 28 and 371), I reported that "In India there is a superstition that tea made from the leaves of the plant (*Centella Asiatica*) acts as a brain stimulant." Recently this story went out as a news release from the North Carolina Department of Conservation with the word "superstition" omitted and with my name introduced in such a way that, from numerous letters received, many people were induced to not only believe the story but to believe that I believed it.

In every communication in which I have related this story, I have called it a superstition. And to have the publicity people, by implication, get one lined up in support of a superstition becomes a serious matter.

Fortunately most scientists have so frequently suffered from publicity misrepresentation that they will be skeptical as to the authenticity of such a story. An occasional extreme examples of how tortuous publicity operates may help keep them on their guard. However, in this instance there was no chance given to prevent this unfortunate twist in the writer's relation to a botanical superstition.

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### Blood Group Factors and Ethnic Relationships

Upon the basis of certain extremely interesting and valuable findings concerning the frequency distribution of certain blood group factors among the ethnic groups of mankind Dr. A. S. Wiener (*Science*, 1946, 103, 147) criticizes a diagram (Fig. 18) which appears in a recently published book of mine (*An introduction to physical anthropology*). Dr. Wiener writes: "In view of these findings [on the blood groups], the Australian aborigines (*sic*) appear to be more closely related to the Mongoloid group than either the Caucasoid or Negroid groups, and the diagram should therefore be revised accordingly."

That Dr. Wiener would consider, as he appears to do, blood group factors alone sufficient to indicate the closeness of the genetic relationship between various groups of man is to me nothing short of astonishing. I have thought that all students of the subject, including Dr. Wiener, were agreed that the inferences drawn from such data could, at most, be regarded only as suggestive. It would be the last to underestimate the potential value of the blood group factors in helping us to untangle the skein of hominid ethnic relationships, but I cannot see that any useful purpose will be served by making these factors bear more than they can carry. As I have written in the book to which Dr. Wiener refers: "The non-adaptive, non-selective nature of the blood group genes renders them of great potential value in the tracing of ethnic relationships. It is, however, not to be expected that it will be possible to solve anthropological problems by merely turning to blood group tables, as one would look up a definition in a dictionary. This is particularly worth emphasizing in view of the fact that neither the evolutionary nor the ethnic implications of the blood groups can as yet be said to be quite clear" (*op. cit.*, p. 134).

I am convinced that the problem of human ethnic relationships will be most fruitfully attacked by the use of genetic methods of analysis, and that the blood group factors will play an important part in that attack, but in conjunction with the analysis of a good many other characters, the genetic behavior of which is more or less understood. Taken alone, blood group factors will not tell us very much, and any attempt, at the present time, to erect or criticize a classification of the ethnic groups of man on the basis of such factors alone would be, to say the least, premature. As Dr. Wiener may possibly have forgotten: "The blood tests have limitations, because peoples of the same race may have widely different distributions, while totally unrelated races may have a similar serological classification" (A. S. Wiener. *Blood groups and transfusion*. (3rd ed.) Springfield, Ill.: C. C. Thomas, 1943. P. 330).

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## Book Reviews

*Physical methods of organic chemistry.* (Vol. I.) Arnold Weissberger (Ed.). New York: Interscience Publishers, 1945. Pp. vii + 736. (Illustrated.) \$8.50.

The emphasis in this first volume of a two-volume collection of monographs is heavily on the physical methods opposed to the organic chemistry. It should be a valuable reference work for any chemist who wishes to make useful measurements of physical properties. The subjects of the 16 chapters are all determinations which are important in the characterization of organic compounds for the elucidation of their structures and behavior. They are presented with the authority of genuine experts, and most of them with compassion for the nonexpert. The editing has been successful in eliminating duplication and overlapping. The topics range from measurements which are an everyday task in every laboratory to those which are pretty much a job for a specialist. With the former, the critical discussion of limitations and precision would have much value; with the latter, the reader may at least grasp the significance and the limitations of the technique. Sturtevant's article on calorimetry is a model treatment, covering the field from the refinements necessary for the utmost precision or under extreme conditions to an unprejudiced assay of the value of relatively crude and simple methods, and refraining admirably from an overemphasis of the author's own accomplishments and special fields of interest. The excellent articles on viscosity, osmotic pressure, and diffusivity reflect current interest in high polymers.

The subjects covered are melting, freezing, boiling, and condensation temperatures, density, solubility, viscosity, surface and interfacial tension, properties of monolayers and duplex films, osmotic pressure, diffusivity, calorimetry, microscopy, crystal form, X-ray and electron diffraction, and refractometry.

LOUIS P. HAMMETT

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*Cambrian history of the Grand Canyon region.* Pt. I: Stratigraphy and ecology of the Grand Canyon Cambrian. Edwin D. McKee; Pt. II: Cambrian fossils of the Grand Canyon. Charles E. Resser. Washington, D. C.: Carnegie Institution of Washington. 1945. Publication 563. Pp. viii + 232. (Illustrated.) \$2.50 (paper); \$3.00 (cloth).

Grand Canyon, with its over 100 miles of continuous outcrops, is an ideal region for the tracing of sedimentary rock types (facies) and time planes and the demonstration of their relationships.

Four major groups of facies make up the Cambrian section, each comprising a formation, the Tapeats Sandstone, Bright Angel Shale, Muav Limestone, and unnamed upper dolomites. The three lower formations record one major marine transgression from the west across northern Arizona. Each formation represents one dominant facies and several lesser, related ones, and is

defined without regard to time planes. Formational boundaries are arbitrary and follow the contacts of interfingering tongues which express the actual relationship between the units. Oscillations of the shore produced two minor groups of facies (one transgressive, the other regressive) which show a definite sequence from the shore seaward. The sediments of each facies are pictured as built up to a considerable thickness in a staggered arrangement as the facies shifted back and forth.

Time planes are established by key beds (three fossil horizons and many beds of distinctive lithology) which are traced along the outcrop. A few extend across the region, others for from 30 to 80 miles. Altogether they form an overlapping series of planes which, superimposed on the lithologic pattern, show the time relations.

Fifteen facies are analyzed. Only the conglomerate facies represents beach or near-shore conditions, and the Tapeats coarse-grained sandstone is considered an off-shore deposit (1 to 20 miles, in water depths of 20 to 60 feet). Transgressive facies are, in sequence from sea shoreward, the Muav mottled limestone (its shoreward margin 150 miles from the strand), a *Girvanella* limestone, and a tongue of rusty-brown dolomite passing into shale. This thin, but extensive, dolomite is considered an original facies precipitated in an area of slight deposition. Regressive facies are, from the shore-side seaward, shales, occasionally flat-pebble conglomerate, platy siltstones, and thin silty limestones. McKee argues for the deposition of flat-pebble conglomerate well below sea level and many miles distant from shore, but does not make clear the site of origin of the pebbles. Glauconite, abundant in both groups of facies, is considered indicative of many significant diastems.

Seven members of the Muav, and one member and seven dolomite tongues in the Bright Angel, are named. The members are rock units representing age subdivisions, and their boundaries are determined by the lithologic key beds. The steady eastward (shoreward) thinning of these rock units indicates that the slow, uninterrupted accumulation of limestone more than balanced the permanent sedimentation of detrital material because of frequent breaks of nondeposition or scour in the east.

The Cambrian sea encroached upon an Ep-Algonkian erosion surface which, in the west, was on granites and had a relief under 100 feet, but in the east, had faulted Algonkian ridges forming 800 foothills. The major transgression consisted of periods of rapid sinking of the basin and eastward spread of the transgressive facies, followed by cessation of sinking, filling of the basin, and westward spread of the regressive facies. The single member of the Muav in easternmost Grand Canyon marks the turning point of sedimentation. The uppermost Muav member indicates that the major Cambrian regression had started, but no further westward shift of facies is apparent as the section passes vertically into dolomites. The latter are interpreted as regressive ma-

rine deposits in a filled basin covered by very shallow, concentrated water.

In Part II all known fossils are reviewed and described. One cystoid, 1 gastropod, 14 brachiopods, and 36 trilobites merit specific description, and a number more are placed generically. The paucity and poor preservation of the material is amazing, and more intensive collecting should be done. An *Olenellus* and *Antagmus* horizon date the lower beds as late Lower Cambrian. Horizons of *Alokistocare althea* and *Glossopleura mckeei* and of *Solenopleurella porcata* date most of the Bright Angel and the Muav as early Middle Cambrian. The collections are too small to indicate distinct faunal zones or satisfactory zonal correlations.

CHRISTINA LOCHMAN

Mt. Holyoke College

**Physical chemistry of cells and tissues.** Rudolf Höber and collaborators. Philadelphia: Blakiston, 1945. Pp. 675. (Illustrated.) \$9.00.

This is the book which we had long been expecting as the American analogue of Dr. Höber's *Physikalische Chemie der Zelle und der Gewebe*. That went through six editions, and the last, in 1926, is encyclopedic and a classic for the cell physiologist. It probably would have been asking too much of the author to have maintained the same scheme of the original edition. Perhaps this may still be done.

The present book follows the current vogue of multiple authorship, the author having enlisted the services of four collaborators. David I. Hitchcock, of Yale, and J. B. Bateman, of the Mayo Clinic, are responsible for the first two sections, which are strictly on physical chemistry. The section by Hitchcock deals with selected principles of particular import for our knowledge of living matter, viz., diffusion in liquids, reaction velocity and enzyme action, thermodynamics, the energy concept, electromotive force, and properties of aqueous solutions. This section of 91 pages and 126 references is clear and concise, depending freely on the references for essential details—an admirable method of presenting fundamentals with lessened risk of becoming lost in too deep a forest of details.

The second section, by Bateman, is on the physicochemical properties of large molecules, with a discussion of their architectural and functional significance in living matter. This extremely valuable section of 121 pages with 534 references includes a discussion of fibers, films, and membranes so widespread as structural forms of living matter.

The sixth section, by David R. Goddard, of the University of Rochester, is an excellent discussion on the respiration of cells and tissues (74 pages and 199 references). The discussion is devoted to the mechanism of cellular respiration, the development of which has been so largely during the last two decades. Dr. Goddard deals with the energetics and kinetics of the process involving a series of graded steps with many distinct enzymes, the whole constituting an integrated

reaction system. The writer presents a fascinating story of a general pattern of cellular respiration by emphasizing the physicochemical approach. Coupled reactions permit the storage of oxidative energy in the form of high-energy phosphate bonds which may be transferred, stored, or utilized, as needed. The mechanism of energy transfer is suggested by Engelhardt's discovery that myosin, the contractile protein of muscle may itself be the enzyme to induce the hydrolysis of adenosin triphosphate. This case of a catalyst accepting the energy liberated by its substrate would appear to be the first biochemical reaction discovered which directly converts the potential energy of a chemical compound into mechanical work.

Another well-developed section is by Wallace O. Fenn on contractility (79 pages with 316 references). A very brief discussion of protoplasmic streaming, amoeboid and ciliary movement as phenomena of contractility is followed by an excellent account of muscle contractility. Interesting experimental data are presented, and the section ends with a discussion of muscle contracture and a survey of theories of muscle contraction historically developed, ending with the significance given by the newer knowledge of the configuration of protein structure. The phosphate cycle provides the energy, and the change in configuration of the myosin from a partial to a more complete folding causes the shortening. The shortening may result from a phosphorylation of the myosin serving as an enzyme for the removal of  $P_i$  from adenylypyrophosphate.

The four remaining sections are by Dr. Höber and occupy somewhat less than half of the book. A brief section deals with introductory remarks on the architecture of protoplasm. He offers an interesting concept of a chemodynamic machine having a submicroscopic structure which is so spread as to form a very large area for adsorption catalysis.

The section on permeability follows somewhat the classic lines and deals with organic nonelectrolytes, weak bases and acids, dyestuffs and water. From this discussion is deduced the chemistry and physics of the plasma membrane for the structural basis of which he offers evidence. Regarding the permeability of nonelectrolytes, their passage is related to molecular volume and lipid solubility. In an analysis of experiments dealing with pore size, consideration might have been taken of the fact that many nonelectrolytes exist as molecular aggregates varying in size according to the nature and pH of the medium. Moreover, the determining characteristics of the medium may change on approaching surfaces, such as those of cells. The chapters on permeability attest to the great variability encountered with different types of cells, a valuable feature to be pointed out in the face of those who may attempt too sweeping generalizations. Dr. Höber is to be commended for the carefulness of his survey. The only question which arises is whether the subject may have been more easily handled if, instead of grouping various cell types under headings of permeability to different substances, the different types of cells had been taken



separately with respect to their permeability to various substances. In the section dealing with extracellular factors on cellular activity, the author discusses the influence of organic ions on hydration and dehydration of cell colloids, on fiber and cell potentials. This leads into selection-permeability and bioelectric membrane potentials. One chapter discusses the influence of ions on cell potentials in plants, and is an excellent summary of the work of Brooks' and Osterhout's groups. The chapter on narcotics again brings up the concept of the plasma membrane as lipoid in nature with a sieve structure. The last section deals with a favorite field of the author's extensive research activities. Here the author distinguishes between passive penetration and active transfer, the latter appearing to be "enforced" by energy ordinarily derived from cell metabolism and indispensable for the process. Good chapters follow on intestinal absorption, the formation of urine, and the elaboration of digestive juices. Passive and active transfer are also discussed in relation to the body surface of aquatic animals and of plant cells. The last chapter is an excellent discussion of the energetics of active transfer and possible mechanisms in the localization of enzymes constituting a chemical organization comparable to the morphological organization of cell structure. In many places the author gives free play to his imaginative genius and makes us wish he had greatly expanded his part of the book for us to profit more by the broad background of his knowledge and the wealth of his own contributions. This is a book which should be in the hands of all students of fundamental problems in physiology. One would wish that, for books such as this, funds were available to subsidize their publication so as to bring the price within the range of the usual scientific worker.

ROBERT CHAMBERS

New York University

## Scientific Book Register

- ARIANI, JOHN. *The chemistry of anesthesia*. Springfield, Ill.: C. C. Thomas, 1946. Pp. 536. (Illustrated.) \$7.00.
- ARCHER, W. ANDREW. *Collecting data and specimens for study of economic plants*. (U. S. Dept. of Agric., Misc. Publ. No. 568.) Washington, D. C.: Government Printing Office, 1945. Pp. 52. (Illustrated.)
- BELLINGHAM, ELLEN F., et al. *Bibliography of industrial hygiene, 1900-1943: a selected list*. (U. S. Publ. Hlth Serv., Publ. Hlth Bull. No. 289.) Washington, D. C.: Government Printing Office, 1945. Pp. 106. \$2.00.
- BURCH, PHIL. E. *The annual temperature cycle of Lake Michigan. 2: Spring warming and summer stationary periods, 1942*. (Dept. of Meteorol., Misc. Rep.

- No. 18.) Chicago: Univ. Chicago Press, 1945. Pp. 100. (Illustrated.) \$1.50.
- DICKE, F. F., and JENKINS, MERLE T. *Susceptibility of certain strains of field corn in hybrid combinations to damage by corn earworms*. (U. S. Dept. of Agric., Tech. Bull. No. 898.) Washington, D. C.: Government Printing Office, 1945. Pp. 36. (Illustrated.) \$1.10.
- DOEBEL, SISTER MARY OF GRACE. *The preparation of certain isomeric heptanes*. Washington, D. C.: Catholic Univ. America, 1945. Pp. 43. \$1.00.
- DUBOIS, JOHN HARRY, and PRIBBLE, W. I. *Plastics mold engineering: the fundamentals of plastics mold design and construction*. Chicago: American Technical Society. Pp. 503. (Illustrated.) \$7.00.
- GARDNER, ROBERT. *Some soil properties related to the sodium salt problem in irrigated soils*. (U. S. Dept. of Agric., Tech. Bull. No. 902.) Washington, D. C.: Government Printing Office, 1945. Pp. 28.
- HARRIMAN, PHILIP LAWRENCE. (Ed.) *Twentieth century psychology: recent developments in psychology*. New York: Philosophical Library, 1946. Pp. xiii + 712. (Illustrated.) \$6.00.
- KIVER, MILTON S. *Television simplified*. New York: Van Nostrand, 1946. Pp. 382. (Illustrated.) \$4.75.
- KUDO, RICHARD R. *Protozoology*. (3rd ed.) Springfield, Ill.: C. C. Thomas, 1946. Pp. 778. (Illustrated.) \$8.00.
- LANTZ, BEATRICE. *Some dynamic aspects of success and failure*. (Psychol. Monogr., Vol. 59, No. 1, Whole No. 271.) Evanston, Ill.: American Psychological Association, 1945. Pp. 45. (Illustrated.)
- LESPANGNOL, ALBERT. *Pharmacie chimique avec les preparations industrielles des medicaments*. (2nd ed.) Paris: Vigot Freres. Pp. 911.
- MARKUS, JOHN, and ZELUFF, VIN. (Eds.) *Electronics for engineers*. New York: McGraw-Hill, 1945. Pp. 400. (Illustrated.) \$6.00.
- MAURER, EDWARD ROSE, et al. *Mechanics for engineers; statistics and dynamics*. New York: Wiley, 1945. Pp. 442. (Illustrated.) \$4.00.
- MILLER, CAREY D., and BAZORE, KATHERINE. *Fruits of Hawaii; description, nutritive value, and use*. (Rev. ed. of *Some fruits of Hawaii*.) (Univ. Hawaii Agric. Exp. Sta. Bull. 96.) Honolulu: Univ. Hawaii, 1945. Pp. 129. (Illustrated.) \$1.00.
- SCHMEDEL, JOHN B. *Clinical roentgenology of the heart*. (Annals of roentgenology ser., 18.) New York: Harper, 1946. Pp. 391. \$12.00.
- SLADE, SAMUEL, and MARGOLIS, LOUIS. *Mathematics for technical and vocational schools*. (3rd ed.) New York: Wiley, 1946. Pp. 539. \$2.50.
- . *Report on the progress and condition of the United States National Museum for the year ended June 30, 1944*. Washington, D. C.: Government Printing Office, 1945. Pp. iii + 100. \$35.
- . *Wiley trigonometric tables*. (2nd ed.) New York: Wiley, 1945. Pp. 122. \$1.00.

## Catalogue Corner

Please write directly to the company indicated for any publication you wish mentioning the bulletin number and *Science*. Publications are gratis unless otherwise noted.

**Technical notes on Neoprene.** The Organic Chemicals Department of Du Pont recently wrote to ask if we would want to see regularly their *Neoprene notebook*. We do, and so may you. This publication is issued four to six times a year. It contains new technical information about this versatile synthetic rubber based on research in the Du Pont laboratories. The issue we received had short articles on sunlight aging performance of Neoprene compositions, the use of pump or gland packings made of Neoprene, and a page of questions and answers on the properties of the various formulas of Neoprene which the company makes. For your copy ask for *Neoprene notebook SC-464*. Organic and Rubber Chemicals Department, E. I. du Pont de Nemours and Company, Wilmington 98, Del.

**Industrial and radio laboratory equipment.** Readers of *Science* who do research in radio and physics either academically or on a consultation basis will be interested in two items just received from the General Radio Company of Cambridge, Mass. This company publishes a bimonthly publication under the title *The general radio experimenter*. It is attractively printed with charts, graphs, and suitable cuts and punched for filing in a handy notebook. The January-February issue, which has just arrived, contains an article on "The series and parallel components of impedance" and another on "Heat dissipation from cabinets." Scientists who are also sportsmen (particularly fishermen) will enjoy "An engineering approach to trout fishing," which describes the measurements made by one of the company's engineering staff on water depth and temperature in Lake Winnepesaukee. In the same envelope we received a copy of the postwar supplement to the company's general catalogue. In it are details and specifications for a wide range of equipment such as bridges, oscillators and standard signal generators, waveform-measuring instruments, meters, frequency-measuring instruments, and amplifiers and power supplies. For copies, ask for *The general radio experimenter SC-464* and *Postwar supplement to general catalogue K*. The General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Mass.

**Microscope slides.** From George H. Conant of Ripon, Wis., came his catalogue of microscope slides of botanical species. The catalogue is divided into four parts: microscope slides for general botany; guide to special plant structures; supplementary slide list; and special slide sets. The whole issue is excellently illustrated with color prints of some of the slides available. Botany instructors will be interested in the section on special slide sets, which includes combinations of slides on such basic

topics as algae, parasitic fungi, mosses, fern sporophore life history of *Lilium Michiganense*, special plant structures, commercial woods, cytology, general morphology and diseases of economic plants. Requests should specify *Catalogue No. 7, Triarch botanical supplies SC-464*. George H. Conant, Ripon, Wis.

**Biological and pharmaceutical supplies.** The latest catalogue of these products issued by the pharmaceutical laboratories of the National Aniline Division has been received. The table of contents indicates that the company furnishes the following products in research and bulk quantities: commission certified stains; biological stains; vital stains; staining solutions; indicators (Clark and Lubs and oxidation-reduction); laboratory reagents; and certified colors for foods, drugs, and cosmetics. Prices for each product as of the date the catalogue was issued are given. *National pharmaceutical Price list SC-464*. Pharmaceutical Laboratories, National Aniline Division, 40 Rector Street, New York 14, N. Y.

**Wratten light filters.** The Eastman Kodak Company has recently released the seventeenth revised edition of its well-known handbook on this subject. This latest edition, which incorporates the most recent data from laboratory research, has sections on the care of filters, filter sets for commercial and scientific uses, neutral density filters and wedges, sensitizing classes of plates and films, filter factors, mercury spectrum, list of filters and their stabilities, spectrophotometric absorption curves of filters, pairs of filters, infrared absorption spectra, and total and wave-length transmission. *Wratten light filters (17th ed., rev.) SC-464*. \$50, postpaid. Eastman Kodak Company, Rochester 4, N. Y.

**New and established medical books.** Paul B. Hoeber Inc., the Medical Book Department of Harper and Brothers, has mailed in a new catalogue issued in January. In addition to listing books bearing the Hoeber imprint which have become recognized authoritative references, there are descriptions of over 100 recently issued books. Typical of the new books are: *General and plastic surgery (with emphasis on war injuries)*, *Fundamentals of pharmacology*, and *Clinical roentgenology of the heart*. We noted, too, that many of the standard references are scheduled for complete revision early this year. *1946 Hoeber catalogue SC-464*. Paul B. Hoeber Inc., 49 East 33rd Street, New York 16, N. Y.

**Toxicants for insecticides.** A new comprehensive brochure on Thanite, DDT, and derivatives and combinations of both of these insecticide concentrates is now available from Hercules Powder Company. Entitled *The Thanite family*, it is a 32-page book containing considerable new information on the use of these concentrates in household sprays, livestock sprays, flea powders and dips, and in pest and pediculosis control. Among the concentrates discussed are Thanite, Thanite plus DDT concentrate, DDT, water miscible DDT concentrate, and oil-soluble DDT concentrate. *The Thanite family SC-464*. Hercules Powder Company, Wilmington, Del.